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The Chimney Rock Archaeological Symposium

**October 20-21, 1990
Durango, CO**

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Abstract

The purpose of this symposium was to assist the USDA Forest Service in the future development and protection of the Chimney Rock Archaeological Area. Authors assessed the current state of knowledge about the area and helped develop future research goals. Almost a half-dozen models for the explanation of Chimney Rock and other so-called Chacoan Outliers emerged from the symposium. The meetings became a forum on the nature and role of outliers, their origins, their function, and their relationship to a political, economic, and symbolic center.

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The Chimney Rock Archaeological Symposium

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Durango, Colorado

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Introduction

Gary Matlock[1]

Abstract — This is a review of the goals and results of the symposium by its principle convener. The various models discussed during the symposium are summarized: regional shrine, lunar ceremonialism, calendrical observatory, redistributive exchange (timber camp), Chacoan fortress and tribute collection facility, Chacoan port-of-trade, indigenous regional integration, and Chaco mission-entrada.

BACKGROUND OF THE SYMPOSIUM

This volume of papers is about the archaeology and management of the Chimney Rock Archaeological Area in southwestern Colorado. The area is a 3100-acre, "special management unit" of the San Juan National Forest. It contains the prehistoric remains of the eastern-most group of Anasazi people in southwestern Colorado and is the northeastern-most segment of the entire Anasazi Culture, depicted in the Regional Map of Chimney Rock Archaeological Area (fig. 1). This area of the Anasazi world is designated by archaeologists as the Piedra District of the Northern San Juan or Mesa Verde Branch of the Anasazi Culture.

The area is located along the upper Piedra River, a major southwest Colorado drainage, which flows nearly straight south from the San Juan Mountains into the San Juan River. Chimney Rock rests at the base of these spectacular mountains.

The papers resulted from a symposium on Chimney Rock held in October of 1990 at Fort Lewis College in Durango, Colorado. The symposium was sponsored by the Colorado Archaeological Society, the USDA Forest Service, and Fort Lewis College. I originally intended for the symposium to help develop and protect the archaeological area through assessing the current state of knowledge about the area and the Piedra District. A second goal was to develop future research goals for it. As such, the symposium had no other theme or organizing focus.

It was somewhat of a surprise that the symposium generated as much interest and participation as it did. The original proposal for the symposium rapidly grew from what was envisioned as a small gathering of scholars around a table to a full-blown, 2-day symposium attended by approximately 200 people. The attendance by the public and many participants is due largely to the efforts of Susan Ootan and other members of the Colorado Archaeological Society. In the end, 13 individuals presented papers at the symposium and at least 4 others submitted papers for inclusion in this volume. Four papers given at the symposium are not included either: (1) at the author's request; (2) because their papers (the specific Gallina papers) will be the subject of a forthcoming symposium and similar volume; or (3) because their reviews of the final versions were not forthcoming.

The papers at the symposium centered on two major issues: Chimney Rock and the Chaco Connection and Chimney Rock and the Gallina Connection. Both of these are topics that clearly need further research at Chimney Rock. The papers that were presented on the Gallina Connection suggest that there may have been geographic, cultural, and chronological relationships between what archaeologists now perceive as two distinct Anasazi groups. Specifically there seem to be architectural and ceramic ties between the Chimney Rock in southwestern Colorado and the Gallina in northwestern New Mexico. Several possibilities seem to exist, although none are clear now. Did the Piedra/Chimney Rock people migrate to the Gallina area following the abandonment of the area? Were there, in fact, Gallina people at Chimney Rock during the Chimney Rock Phase? The architecture on the mesa below the Great House would seem to suggest such a possibility. Following David Wilcox (see "The Evolution of the Chacoan Polity" chapter), it is even tempting to suggest that there might have been three groups at Chimney Rock simultaneously: a Chaco "religious elite," some Gallina workers or mercenaries nearby, and an indigenous population in the valleys below. In his original

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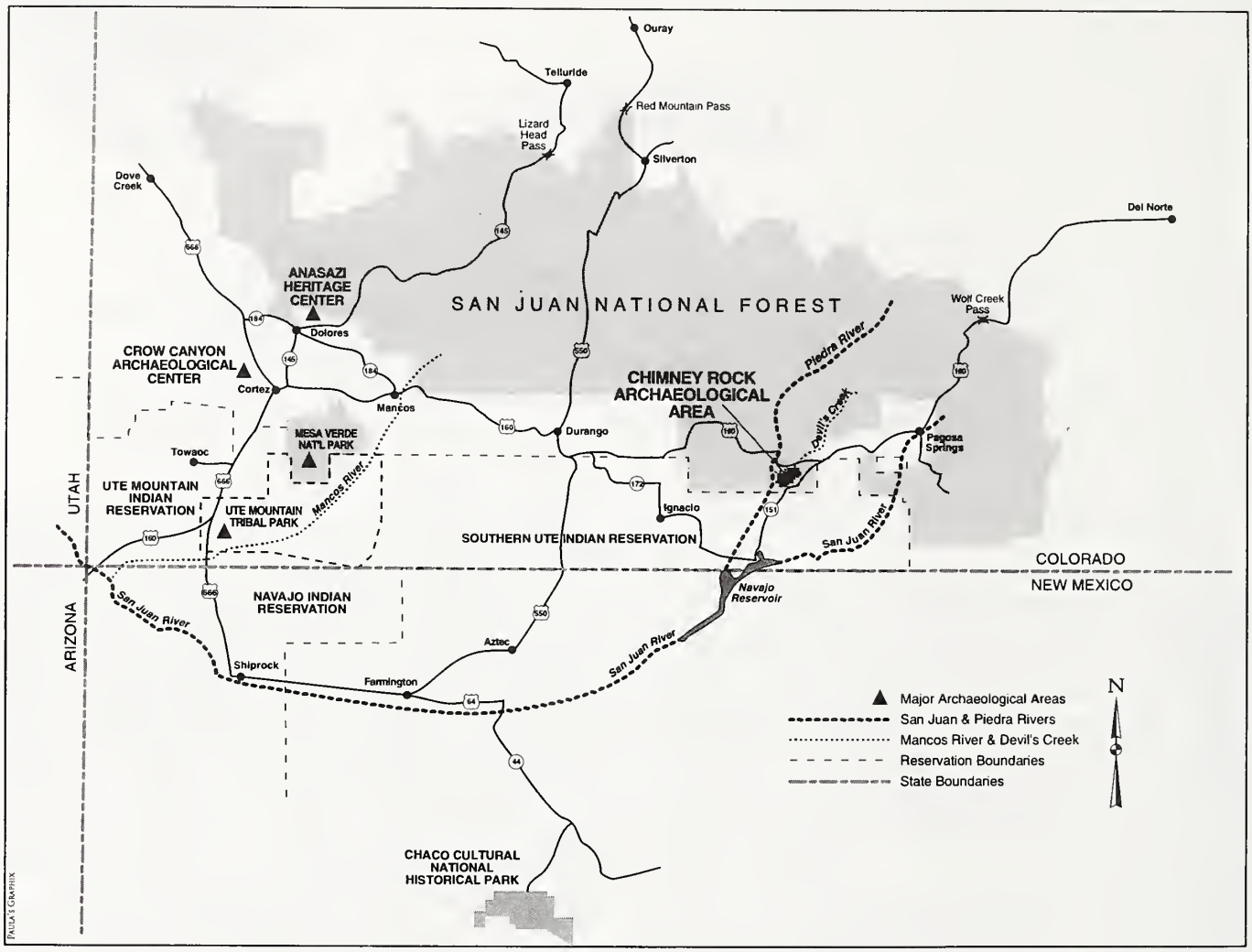

Figure 1. – Regional map of Chimney Rock Archaeological Area.

assessment of Chimney Rock archaeology, Eddy (1977) defined a developmental relationship to Gallina, but no one has yet pursued this suggestion.

In any case, because the subject needs further examination, we decided that a separate symposium on Chimney Rock and the Gallina was in order. For that reason, the papers on the Gallina were not included in this set of proceedings, but will be a part of a similar volume to be issued in 1993 or 1994.

Almost a half-dozen models for the explanation of Chimney Rock and other so-called Chacoan Outliers emerged out of the symposium. Several reasons for this interest became clear as the symposium progressed. One is that this was the first opportunity that Colorado archaeologists have had to discuss outliers in the state. A second is that while there has been a great deal of interest and research in the Chaco Phenomena from the platform at or near Chaco Canyon itself, it soon became clear that the Chimney Rock symposium was to be a forum on the nature and role of these outliers, their origins, their function, and their relationship from the standpoint of the outliers themselves.

The robust nature of the debate and the wide variety of models and explanations for Chimney Rock and other outliers that were proposed at the symposium (often conflicting models developed from the same information base) is testimony to the interest, importance, and infancy of this topic for archaeological inquiry.

The papers ranged from brief comments on the past or future research and development of Chimney Rock, to carefully prepared papers about past or future research needs and accomplishments. Although all of the papers centered on Chimney Rock, their scope ranged from Chaco Canyon to the south to a variety of topics about Chimney Rock and other large outlier sites in southwestern Colorado.

THE USDA FOREST SERVICE AND CHIMNEY ROCK

The original goals of the USDA Forest Service were well met by the information presented at the symposium. The development, management, and preservation of the Chimney Rock Archaeological Area has been an on-again, off-again pursuit of the USDA Forest Service since the late 1960's and, to some extent, well before. The symposium and the papers contained herein serve as the beginning of a new round of planning and development of the area.

The history of the development of Chimney Rock is described, in part, in the papers by David Breternitz, Susan Collins, and Robert York in this volume. Likewise the history of research is well-documented in the papers by Frank Eddy and Gordon Tucker. Central to the changing emphasis on development of the site for public use has been the issue of the peregrine falcons and the changing priorities of the USDA Forest Service from recreation to commodity production, back to recreation and public use again. While the peregrines may or may not return, it is reasonable to assume that the USDA Forest Service will ebb and flow in its priorities as the public at large changes its values and goals for use of the National Forest lands. With the designation of Chimney Rock as a "special management unit" and its position on the National Register, it is likely that if we don't love the place to death or overuse it, it will survive the oscillations of changing public policy comfortably.

The USDA Forest Service's need for information about the area is critical for its planning in several key areas. The first is the extent and relative importance of the resources to be protected. Does the area, for example, need to be enlarged to adequately protect the archaeological resources associated with Chimney Rock and allow for public use at the same time? Should certain areas be set aside for research to the exclusion of public development and use?

The second important need for information is to address properly the interpretive information that is presented to the public when they visit Chimney Rock. It is important that the key concepts or "interpretive themes" be identified for use in interpretive signing, brochures, books, and other pubic information devices to be constructed in the area. The guides, and others that meet with and serve the public interest in the area, need accurate and complete information to do their jobs. It is important that the public understand Chimney Rock in its archaeological context as a whole rather than as an isolated Anasazi site. The information presented at the symposium, and in this volume, will serve to guide that effort for many years to come.

Finally, the USDA Forest Service's planning efforts will involve the preparation and implementation of short- and long-term research plans for the area. The USDA Forest Service has a long tradition of substantive research in association with universities and colleges throughout the nation. For the past several decades, this research has been oriented toward natural resource management and production--primarily timber economics, management, and range-related subjects. As the USDA Forest Service changes its emphasis in the next decade, it will expand its research in other areas of resource management, including archaeology and cultural resources.

In 1992, the agency founded a research division in association with the University of New Mexico as a unit of the Rocky Mountain Forest and Range Experiment Station. The agency expects that this division will grow considerably in the next decade. In order to participate in these research efforts and to learn more about Chimney Rock, it is necessary at this early stage of planning to determine the research problems and needs of the area and to place the research in a broad perspective that will contribute to many larger interests and questions about the archaeology of the region as well. The papers in the volume will provide both the general and specific orientation for research at Chimney Rock. The research should be one of the most exciting aspects of development of the area in the future.

BACKGROUND OF PAPERS PRESENTED

While Dr. Duke offers a parable, comments, and a critical review of the papers at the end of the volume, a brief introduction is useful, especially to the reader sorting out which of the papers might be of most interest.

Originally there was no intent to publish the proceedings of the symposium. After the symposium had concluded, several scholars and members of the public felt that publication was warranted because of the quality of the papers and the contributions that they made. Dr. Malville did the initial editing, a task which proved to be somewhat more difficult than we had expected because of the diversity of the papers and their length and level of effort. Some of the papers represent major efforts to develop explanatory models for testing while others are relatively short comments on the site or the archaeology and management of the archaeological area. A few other papers are edited transcriptions of remarks made at the symposium that were not intended to be published.

The first section contains three short papers that were given at the symposium and later transcribed for the authors to review for inclusion in the proceedings. Both Breternitz and York provide interesting historical material on the history of research and management at the Chimney Rock Archaeological Area. In addition, both suggest avenues for future research at the area. York stresses the need for a tree-sourcing study to determine if trees from Chimney Rock were being used for construction at Chaco Canyon. This research would serve as a definitive test of the timber-camp hypotheses outlined by Allen Kane (see the "Settlement Analogues for Chimney Rock: A Model of 11th & 12th Century Northern Anasazi Society" chapter). In the two years following the symposium, the research proposed by York and others at the symposium on tree sourcing is underway with preliminary results expected within a year.

Dr. Breternitz recommends a closer examination of Chimney Rock-Gallina relationships and suggests that archaeologists look south instead of west for cultural affinities and possible migration areas for the Piedra-Chimney Rock area. Once again, it appears the Anasazi may be disregarding our carefully constructed modern day state boundaries. This always presents a problem for archaeologists.

Papers in the recent research section include an update on research by Eddy, who has contributed more substantively to our knowledge of the area than probably any other archaeologist. The paper includes recent work by the University of Colorado, the USDA Forest Service, Fort Lewis College, and others. Primary data is included on materials sourcing such as the identification of obsidian transported to Chimney Rock from southern New Mexico, a small piece of information but one with important implications. Other topics include recent mapping, aerial photography, and detailed architectural studies.

The clay sourcing study of feather holders and ceramics represents another attempt to link Chimney Rock and Chaco Canyon through specialized artifact types. Additional work in this field is clearly warranted and would likely contribute to our knowledge of the Chaco Connection in fundamental and unpredictable ways.

Malville's recent research presents a convincing argument for an understanding of lunar cycles by the inhabitants of Chimney Rock, in particular the major 18.6 year lunar standstill cycle. Not only did the moon rise between the two Chimney Rocks during the occupation and use of the site, but also construction dates suggest that periods of construction at the site coincided with the event. The research represents one of the clearest cases for prehistoric astronomy among the Anasazi and provides a non-material cultural view of the Anasazi world. It also constitutes another model to explain the existence, function, and Chaco relationships at Chimney Rock. In Malville's astronomical model, Chacoan populations were drawn to Chimney Rock because of the site's importance as a shrine with significant astronomical associations.

Jeannette Mobley-Tanaka ("Intracommunity Interactions at Chimney Rock: The Inside View of the Outlier Problem" chapter), as does Gordon Tucker in his paper ("Chimney Rock and Chaco Canyon: A Critical Re-examination of the Outlier Concept" chapter), presents a strong case for the indigenous development of the Great House and other Chaco associated phenomena at Chimney Rock and argues against a dominant "Chaco Elite" that built and operated the facility. In addition, she examines in greater detail architectural variability and function in the Upper Piedra area.

The examination of the Chaco Connection at the symposium points up the current problem of interpreting the role of Chaco in the larger San Juan Basin. The discovery of the so-called Chaco Outliers and their associated roads, great kivas, and other distinct features and material culture caught archaeologists quite by surprise. The implications and existence of such a deliberate system cast a very different light on our perceived understanding of Chaco and other Anasazi at the time.

While the presence of Chaco-like masonry, trade ceramics, great kivas and other Chacoan traits had long been known in southwestern Colorado, their existence could be accounted for in a number of ways consistent with our understanding at the time. The radical change to all of this was that, in New Mexico at least, some of the outlying sites "had roads running to them or between them." This provided a physical connection that demanded new explanations for the Chaco branch. The dilemma is compounded in Colorado by the fact that the Chacoan roads all seemed to stop at the New Mexico border. This is because the research funds that located the Chaco roads stopped at the New Mexico border, not the Chaco themselves. The location and nature of these roads in Colorado has yet to be established. While New Mexico archaeologists have been examining the Chaco phenomena for over a decade, serious research into outliers and roads is just now beginning in Colorado. Three of the more thoroughly excavated sites--Escalante, Wallace, and Chimney Rock--exist here. We are still searching for a plausible and, at least somewhat satisfying, explanation for these various Chacoan-like elements.

It has been clear from the earliest work in the area, and during the subsequent years of definition of the various cultural units, that Chaco Canyon and the Chacoan branch were more complex than other branches of the Anasazi. Archaeologists looked for an external and superior source for this complexity at Chaco. The elements that made for the elaborate kivas, fine masonry, and large multi-storied, quasi-urban centers must have come from New Mexico. Research at Cases Grandes and elsewhere, searched for these relationships and, in some cases, appeared to find them.

Our understanding of the Chaco Center, within and near the Canyon itself, has grown with the work of the National Park Service's Chaco project in the 1970's. However, no such well-organized and well-funded efforts have been directed toward the outliers. The outliers are still being located; we now have almost 120 candidates. Basic descriptive work on outliers and a great deal of discussion about the nature of their relationship to Chaco was done, primarily in New Mexico (Powers et al. 1983).

The papers included in this volume indicate a lack of enthusiasm for previous explanations for outliers and their role in the Chaco phenomena. They also indicate a continuing strong interest to understand and explain them, as they have important implications for our understanding of the Anasazi as whole. The models presented here may not significantly solve the dilemma of Chaco and its outliers, but they do provide a number of fresh and creative directions in which to pursue such explanation. I suspect that we shall be having a good time with the "Chaco Connection" for some time to come in southwestern archaeology. Certainly the authors in this volume are doing their best to stir things up.

In Tucker's paper, "Chimney Rock and Chaco Canyon: A Critical Re-examination of the Outlier Concept", he re-examines the Chaco implications at Chimney Rock based on his dissertation work several decades ago. Arguing, as did

Mobley-Tanaka, from the standpoint of one who has conducted basic research at Chimney Rock, he questions that Chimney Rock is, in fact, an outlier to Chaco. Instead Tucker feels that Chimney Rock, and possibly other outliers as well, could be considered "Ports of Trade" with a religious component. I refer to this as "the Missionary and the Coca-Cola theory." To this extent, Tucker discusses possible trade routes and concludes that Chimney Rock was likely constructed by a "local elite" rather than a "Chaco elite."

The "Bonito Style Community Structures: Chimney Rock Pueblo in Regional Context" by John Roney, is a solid description of what constitutes an outlier, or as Roney prefers to call "a Bonito Phase complex." He convincingly argues that the "Great House" and probably the High Mesa complex at Chimney Rock is, indeed, the product of Chaco people. Roney's paper is a clear statement of the history and nature of outliers and their probable relationship to Chaco Canyon. It is a solid contribution from an experienced New Mexico scholar.

Kane's paper suggests that Chimney Rock was a resource gathering and processing center for Chaco Canyon, specifically for wood beams for construction at Chaco. As Kane states, "The redistributive exchange system model here is pushed to its fullest extent in the hopes of stimulating discussion and applicable field research". I think this captures the atmosphere of the symposium.

Kane's approach is pushed further by the "Spanish Entrada" theory offered by Bruce Bradley as an outgrowth of his research on the large Montezuma Valley outlier, the Wallace Ruin. He suggests a "missionizing" effort by Chacoan religious leaders with central missions and outlying visitas, a pattern similar to that found in Spanish New Mexico. This model attempts to account for the differing sizes of Chaco related outliers in the San Juan Basin. Also important in Bruce Bradley's paper ("Wallace Ruin: Implications for Outlier Studies), is his description of the construction history at Wallace and the need for field excavations at outlier sites to fully understand the complexities of the entities.

Wilcox's excellent final paper stretches traditional interpretation of outliers, Anasazi, and Chaco even further, suggesting that the phenomena may have included militaristic elements and that Chimney Rock could perhaps have a "Roman Garrison" function. The paper is one of a number of current papers, including previous papers by Wilcox which looks at the regional systems in southwest American (Crown and Judge 1991).

In all, this volume should keep interested southwestern Anasazi and Chaco scholars busy for some time. It is a major foray of Colorado archaeologists into the business of the Chaco phenomena in Colorado.

On behalf of the USDA Forest Service, I would like to acknowledge the help and assistance of the many groups and people who turned the Chimney Rock format of a few scholars around a table into a much more useful symposium. We appreciate the facilities of Fort Lewis College and the work of Dr. Philip Duke in arranging space and donuts. Dr. Jim Judge, of the Department of Anthropology at Fort Lewis College, served as chairman for the symposium. He kept it lively and on time. Susan Ootan and others at the Colorado Archaeological Society organized the symposium and the participants. She is largely responsible for recognizing that the symposium was of broad general interest to archaeologists in the region. She also recognized that there would be a great deal of interest in the subject and the site itself by the general public which is always a welcome addition to archaeology today.

Welcome to the Symposium

Susan M. Collins[1]

Abstract — A Colorado State Archaeologist gives a perspective on Chimney Rock and Colorado archaeology.

In addition to welcoming you to this symposium, I wish to make a few comments about Chimney Rock and the archaeology conducted there the past 70 years. Anyone who has visited the site of this amazing geological formation is startled by the setting. Its dramatic and unusual form has been inspirational for the general public and for the archaeologists who have worked there.

Chimney Rock was the location of some of our earliest home-grown Colorado archaeological investigations. Certainly it wasn't the first place that archaeologists worked in Colorado. Before Jeancon did his work at Chimney Rock during the 1920's, there was considerable field work at Mesa Verde and the McElmo area in the Southwest. The excavations by Jeancon, Roberts, and Martin (of the Colorado Historical Society and the University of Denver) were some of the first Colorado-sponsored archaeology and represents what Coloradoans wanted to do about the archaeology of our state.

Subsequently, Chimney Rock faded from attention for several decades. This may have been because of its inaccessibility coupled with travel restrictions during the depression and during World War II. Then, in the late 1960's, the USDA Forest Service began considering redeveloping it as a tourist attraction. The University of Colorado was funded to do some excavation in anticipation of opening it to the public. This was the impetus of Frank Eddy's work beginning in 1970.

From 1970 to the present time, scholars have pursued diverse, creative research projects in and around Chimney Rock. There has been a great deal of interest and excitement about Chimney Rock from researchers, avocationalists, and the government. Some of these different efforts are complementary and built toward a synthesis of understanding about Chimney Rock. Others, however, are in conflict. At this time, there appears to be no broadly held consensus about what happened at Chimney Rock or why it happened.

Perhaps we can look at Chimney Rock as a mirror for our society and for archaeology at large. In the 1970's, a decade of social change in America, archaeology became interested in social organization. This is reflected by the interpretation that the pueblos at Chimney Rock were established by people having a rigid and hierarchical society with a firm sexual definition of roles. In the 1980's, new interpretations emphasized different prime movers. One interpretation, which is a more utilitarian approach, is that Chimney Rock was essentially a center for resource procurement. We also have a celestial interpretation that the finest architecture was built to watch the skies for an event that happened once in 18.6 years. You can't get much more utilitarian than that!

Do we really know what happened at Chimney Rock? Was there an ultimate reason for living there? Chimney Rock challenges us to think about the mental processes that archaeologists use to make inferences about the past. Do we have rules for logic, or can we say that "anything goes" in terms of archaeological interpretations?

If an explanation is plausible, is it necessarily probable? What are the rules for ethnographic analogy, using living cultures in making interpretations about the past? What are the rules for proof? What kind of independent verification of interpretation do we seek to accept as correct?

This symposium is an exciting development. It is the first time in 20 years that all of the current scholars have met to share their thoughts and interpretations of Chimney Rock.

[1] *Susan Collins is a Colorado State Archaeologist and Deputy State Historic Preservation Officer for the Colorado Historical Society in Denver, Colorado.*

Some Thoughts on Chimney Rock

David A. Breternitz[1]

Abstract — A major unresolved question pertains to the fate of the inhabitants of Chimney Rock. Similarities of architecture and terrain with that of the Gallina sites suggest either contemporary occupation or migration to Gallina.

A central question concerning Chimney Rock is, "Where did the Chimney Rock inhabitants go after A.D. 1150?" Three passages from the classic Jeancon and Roberts (1924d) publication are revealing.

> *There are Tewa traditions ". . . of previous occupation of this part of the country (Pagosa-Piedra region) by the Tewa" (p. 275; also in Reed 1949).*
>
> *"Just south of the bend of the San Juan River, in southwestern Archuleta County, is a section of country entering New Mexico which would afford an excellent place for the prehistoric peoples to pass through to the Gallina country. . ." (pp. 275-6).*
>
> *". . .as there is a complete line of ruins of a similar character following the route given above" (p. 276).*

There are striking similarities between the architecture and terrain found at Chimney Rock Mesa and the Gallina sites. Both of these regions exhibit large, thick (3-5 foot) walled structures in a highland situation, at or near the pinyon-juniper and ponderosa-pine boundary.

The sites on Chimney Rock Mesa are characterized by distinctive rock mounds in a rocky terrain dominated by pine trees with pinyon and juniper in the lower elevations of the mesa. As disclosed by excavations, the rock mounds obscure thick (3-5 foot) walls of architectural units containing only a few rooms. These may represent single family or extended family dwellings).

The architectural similarities between Chimney Rock and the Gallina sites are most graphic when comparing the structures on Chimney Rock Mesa with those excavated by Herb Dick for the USDA Forest Service in the Gallina region.

When Frank Hibben reported on his late 1930's to early 1940's work in the Gallina region, he cited the occurrence of pointed-bottom pottery and attributed it to a Woodland influence or origin. That correlation has time and space problems However, looking at the Chimney Rock-Navajo Reservoir District, that there is a pointed-bottom corrugated pottery called Payan Corrugated (described by Frank Eddy and the Museum of New Mexico) .

Finally, the majority of Gallina sites are tree-ring dated in the A.D. 1200's. It is also commonly accepted that somewhere around A.D. 1150 the Chimney Rock region was abandoned by the prehistoric people.

Chimney Rock is in need of a community study to help answer the question concerning the fate of the Chimney Rock inhabitants. Bis sa'ani is the only Chaco Outlier Community which has been adequately studied (Breternitz, Doyel, and Marshall, 1982). It is just a few miles from the central Chaco Canyon complex. There is a series of controlled excavations at the Chimney Rock Pueblo, on Chimney Rock Mesa, and in adjacent lower lying locales. We have conducted surveys which document the settlement pattern of the surrounding territory. Fantastic maps were prepared based on aerial photography. However, I do not believe that any update of Chimney Rock archaeology can be considered adequate unless the community aspect is addressed and these data sources incorporated in detail.

There are other peripheral questions that pertain to the two main topics I propose as essential to understanding Chimney Rock archaeology. The community study should shed light on the dating of, and relationship between, the Chimney Rock Pueblo and the Chimney Rock Mesa inhabitants. Were both localities abandoned at the same time, and in fact, was Chimney Rock Mesa inhabited when Chimney Rock Pueblo was constructed? Future research in the Chimney Rock area will possibly answer these questions.

[1]*David Breternitz is a Professor Emeritis in the Department of Anthropology at the University of Colorado in Boulder, Colorado.*

Changing Times at Chimney Rock

Robert York[1]

Abstract — The history of research and management at the Chimney Rock Archaeological Area includes introduction of peregrine falcons, controversy over the Chimney Rock coal mine, archaeological looting, and the changing priorities of the USDA Forest Service. Further understanding of the archaeology of the site would benefit from a tree-sourcing study to determine if trees from Chimney Rock were used for construction at Chaco Canyon.

During the 1960's and 1970's, the USDA Forest Service spent an estimated $400,000 on archaeological excavations, ruin stabilization, recreational planning, and construction of facilities to develop the Chimney Rock site as a major archaeological attraction. However, when I arrived as the San Juan National Forest Archaeologist in 1978, the Chimney Rock Archaeological Area (CRAA) was closed to public access and archaeological research was not encouraged.

The reason usually given for the closure is that it had come to the attention of the Forest Service that the CRAA was critical habitat for peregrine falcons, a "threatened and endangered species". The consequence of this was that the CRAA would have to be managed essentially as a "peregrine sanctuary," which meant plans to use the area for recreation and archaeological purposes would have to be suspended and possibly abandoned.

Though the "peregrine issue" had something to do with the closure, it appears this management, or rather "non-management" policy had more to do with a change in national, and consequently Forest Service, direction away from recreation and supposed "soft" or non-commodity uses, such as production of more timber.

This change, of course, was prompted by the fact that the U.S. and the Forest Service were broke and developments, such as Chimney Rock, were simply (too simply) seen as a luxury the U.S. could not afford. (I think the Forest Service has changed its thinking quite a bit on this issue and is starting to see recreation and archaeology as potential "commodity resources.")

Slowly, during the 1980's, the CRAA started to be reopened to archaeology and recreation. I think the primary CRAA objective in the 1980's was to ensure that this area would survive intact; that is, it would be available for its planned uses (i.e., archaeology, recreation, and yes, peregrine habitat) when times changed.

Two cases illustrate the fact that the Forest Service was serious about protecting archaeology and the CRAA. The first was the 1983 application by the Chimney Rock Coal Mine to expand operations into the CRAA. This was seen as a serious threat, not only to the preservation of Chimney Rock, but to the Forest Service planning process. After lengthy and intensive environmental, sociological, and economic analysis, plus often bitter public debate, the Forest Service denied Chimney Rock Coal's application.

Around the same time, two men were successfully prosecuted for the looting of archaeological sites within the CRAA. This was a landmark case because the highest fines for an antiquities violation in the United States were assessed and paid. It was also the first archaeology violation in Colorado which the Forest Service aggressively pursued.

Controversial decisions are generally not made by public agencies unless there is strong public support. In this respect, many concerned public sector organizations and individuals also deserve credit for these decisions, particularly the Southern Ute Tribe and the Colorado Archaeological Society, since their actions created a supportive public and political environment.

When I left the San Juan National Forest in 1989, use of the area for archaeological research was poorly supported. There is reason to believe this situation will change dramatically in the 1990's. An example is this Chimney Rock Symposium.

At this symposium, two theories about possible functions for the Chimney Rock are being discussed: the lumber camp and the lunar observatory. To move from speculation to fact, we need to generate hard data to support or reject these theories. I think Mary Sullivan and Kim Malville are on this track in their clay studies.

[1]*Robert York is Senior Archaeologist for the Navajo-Hopi Relocation Commission in Flagstaff, Arizona.*

I do not know if we will ever fully understand a prehistoric system as complex as that of Chaco. However, I am convinced that we should start with questions like, "Were trees from Chimney Rock actually used in the construction of buildings at such places as Chaco Canyon and Aztec?" Then we can get to the larger issues.

In 1987, I proposed that the Forest Service research branch support and fund a tree-sourcing study based on several hypothesis. The reason for the establishment of the Chaco Outpost at Chimney Rock, ca. A.D. 1050, remains a very open question, one that has resisted resolution via an empirical test of a given hypotheses.

Betancourt, et al. (1986) speculated that construction timbers for the large Chaco communities of northwest New Mexico came from places like the Chuska Mountains of Arizona, Mount Taylor in New Mexico, and the San Juan Mountains of southwest Colorado. Allen Kane, in a paper presented at the Third Anasazi Conference, Monument Valley, Arizona, (1986) proposed that the Chaco Community at Chimney Rock was specifically established for this purpose, the first expression of the lumber camp theory. Various empirical tests of these hypotheses have been proposed, primarily by Betancourt, et al. (1986). These mostly have to do with locating appropriate artifacts, such as stone axes associated with Chaco ceramics in the hypothesized locations.

Potentially a more conclusive answer can be supplied by tree sourcing. Simply stated, we would expect that, given the differing geological and soil complexes of the target procurement areas, trees from these locales will be different. They should be "finger printable." What seems especially likely is that discreet characteristics can be defined through chemical and mineral trace element analysis. Tree-ring patterns may also show consistent differences and these studies should be complementary. Assuming that the subject environs have not significantly changed over the last thousand years, we should then be able to compare with archaeological timbers from Chaco Canyon and other Chaco Communities (Aztec, Salmon, etc.) and confidently expect matches if those timbers actually were procured from one or more of the hypothesized source areas. Negative matches would confidently rule out one, some, or all of the source areas and thus would be of equal interest.

History of Research at Chimney Rock

Frank W. Eddy[1]

Abstract — Two factors that could have drawn Pueblo II populations up to the Chimney Rock mesa are the ceremonial and astronomical significance of the Chimney Rock pinnacles and a need to avoid cold air drainage. Pioneering research in the area was conducted between 1922-1928 by Jean A. Jeancon, Frank H. H. Roberts, and Charles Mitten. The Chimney Rock Project of the University of Colorado, 1970-1972, was the definitive survey and excavation of the Chimney Rock area which established the Chimney Rock Phase (A.D. 1000 - A.D. 1125).

The most outstanding showpiece of the Chimney Rock Archaeological Area is the Chimney Rock Pueblo (5AA83), a Chacoan Outlier (Jeancon 1922; Schmoll 1935; Bauer 1977; Eddy 1977; Webster 1983; Eddy and O'Sullivan 1986). This Anasazi Pueblo II site, dated at A.D. 1076 - 1125, is a central settlement within eight surrounding named site groups made up of contemporary satellite support villages (fig. 1). Towering above this site aggregate are twin natural pillars, called the Chimney Rocks. These pillars may have provided a sighting device for Anasazi observations on the rising sun and moon.

Settlement distribution at Chimney Rock shows heavy upland loading, as much as 1,000 feet above the floor of surrounding perennial rivers which offered supplies of potable water (Eddy 1983). Two factors could have drawn Pueblo II populations away from the floodplain of perennial streams and rivers:

1) the astronomical and ceremonial attraction of the ritually symbolic Chimney Rock pinnacles, and
2) avoidance of cold air drainage.

Chimney Rock provides excellent opportunities for investigating the structure and development of Anasazi communities with organization at a level above that of the autonomous village. A model of supra-village organization is the "Regionally Integrated System," (Cordell 1984). The organizational characteristics of this model are the scale of settlement to include size, ranking, geographical networking, and echelons of vertical hierarchy.

The interaction sphere of the Chaco regional system, which includes Chimney Rock, was organized during Pueblo II, the Bonito Phase Times (A.D. 900 - 1140). The regionally integrated level of organization is indicated by the presence of Great Houses, outliers, local villages, specialized craft production of ceramics, as well as complexity of networked lattices as expressed in engineered roads and visual signal systems (Windes 1988).

The Chimney Rock Pueblo suggests close interactions between the prehistoric priestly elite, the local landscape, and astronomical phenomena. The natural pinnacles are attributed to the Twin War Gods in the myths of a Taos kiva group (Eddy 1975) and probably functioned as an astronomical foresight for calendrical, agricultural, and ritual purposes. The latter hypothesis is being investigated by archaeoastronomy and materials sourcing of ritual artifacts.

Archaeological investigations on and around the Chimney Rock Mesa have been carried out intermittently over the last three-quarters of a century. The account of this archaeological work will be reviewed here as a context in which current investigations and interpretations can be evaluated.

STATE HISTORICAL AND NATURAL HISTORY SOCIETY OF COLORADO: 1921-1928

Pioneer research at Chimney Rock was first conducted during the summer of 1921 as a joint venture between the State Historical and Natural History Society of Colorado (SHNHSC) and the University of Denver (DU). The field party was directed by J. A. Jeancon of the SHNHSC who was in charge of five students from DU including Frank H. H. Roberts, Jr. and Charles E. Mitten. Roberts went on to develop a nationally renowned career in archaeology, including highly regarded work with Early Man and research administration through directing River Basin Surveys of the Smithsonian Institution (Stephenson 1967). He

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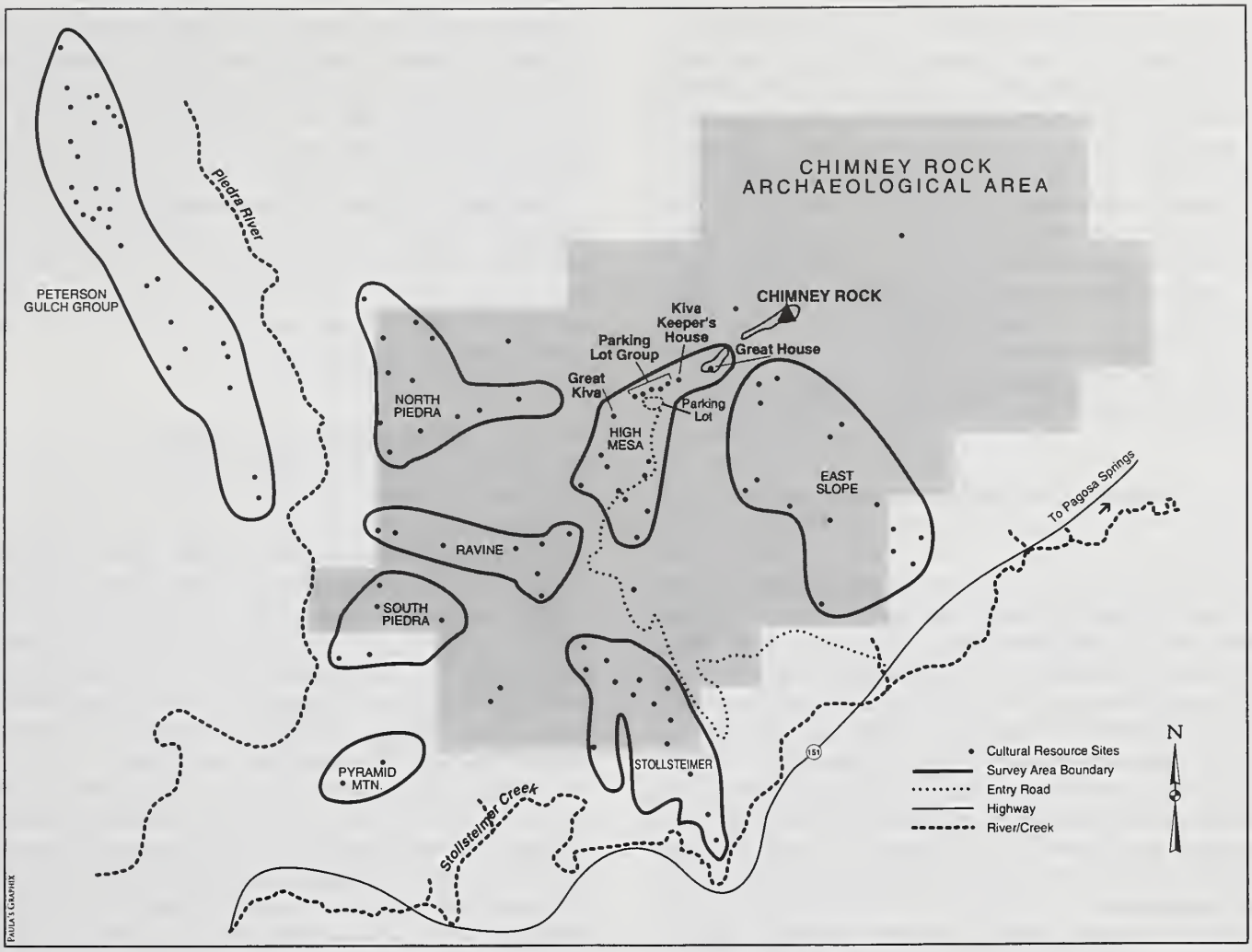

Figure 1. – Site Groups at Chimney Rock (after Eddy, 1977)

made more specific contribution to Chimney Rock archaeology by returning for further work during ensuing years of 1922-1924, and again in 1928.

Mitten had cartographic experience that he used in the construction of a detailed topographic map of the High Mesa Site Group. This map was published as Plate II in Jeancon (1922) and showed the distribution of 108 individual rubble mounds located on both sides of the Chimney Rock ravine. This map was suitable for making settlement and population estimates. It is very modern in appearance and design, unequaled until the aerial photo-mapping of Lightfoot and Grady many years later. The rubble-filled surface mounds mapped by Mitten are now classified to the late Pueblo II stage in the evolutionary sequence of the Anasazi tradition (Kidder 1927). The specific archaeological culture is called the Chimney Rock Phase (A.D. 1000 - 1125) (Eddy 1977; 1988).

Field endeavors during 1921 were distributed over a number of projects such at the Chimney Rock Pueblo (5AA83), Guard House (5AA84), and Causeway site (Location 1, Rooms A and B at 5AA85). In addition, sites located on high Pleistocene age benches down along the Piedra River were also tested. At that time, these sites were found on private property of the Pargin and Harlan Ranches. Recent surveys and small scale excavations identify these sites of the North and South Piedra Site Groups as early Pueblo II in age (A.D. 925 - 1050) being assigned to the Arboles Phase (Eddy 1988).

In 1922, Roberts again returned to the field in charge of the expedition. More rooms were dug in the site they called the Main or Large ruin. Today this site, designated 5AA83, is considered to be a Chacoan Outlier assigned to the Late Bonito Phase (Windes 1988), a site unit intrusion dating between A.D. 1076 and 1125. In addition, further work was also carried out in sites located down by the Piedra River.

During the following years of 1923 and 1924, Roberts continued to conduct site survey. This work was carried down the Piedra and Pine Rivers, tracing Pueblo I and early Pueblo II remains as far south as the towns of Arboles and La Boca. It was during this era that the dense concentration of pit house and jacal surface house settlements on Stollsteimer Mesa were first discovered and tested. Jeancon made one final field effort in 1925 conducting excavations on the Piedra River on the Harlan Ranch.

Roberts (1930) again returned to the upper Piedra valley in 1928, employed by the Smithsonian Institution. Field efforts concentrated on Stollsteimer Mesa located just south of the Chimney Rock Mesa. Publication of the survey and excavation study was by the Bureau of American Archaeology, leading to definition of late Pueblo I and early Pueblo II remains. Today, his Class A and B ruins serve as the type sites for the Piedra Phase (A.D. 850 - 950), while Class C sites are the evidential basis for the Arboles Phase (A.D. 950- 1050) (Eddy 1988).

Results of these pioneer efforts were published by Jeancon (1922) in a small monograph and jointly by Jeancon and Roberts (1923, 1924a,b; Roberts 1925) as a series of short articles appearing in the Colorado Magazine. Additional field work was also carried out in 1924 and 1925, but remain unpublished.

NAVAJO RESERVOIR PROJECT: 1958-1963

Following a 30-year break in field activities, archaeological research was again resumed in the Upper San Juan Basin (Eddy 1966; Eddy in Jelks 1988). This program was one of salvage archaeology conducted by the Museum of New Mexico of Santa Fe under sponsorship of the U.S. National Park Service with funding supplied by the Bureau of Reclamation as authorized by the Reservoir Salvage Act (Dittert, Hester and Eddy 1961; Eddy 1972). Survey and excavations were conducted along the San Juan River from the current location of the Navajo Reservoir upstream to the towns of Arboles and La Boca, which had previously formed the southern limits of the Roberts reconnaissance.

Large resources of Pueblo I and early Pueblo II remains were found, in addition to earlier phases of occupation, including: Basketmaker II sites termed the Los Pinos Phase (A.D. 1- 400); Basketmaker III sites labeled Sambrito Phase (A.D. 400 - 700); and early Pueblo I sites called Rosa Phase (A.D. 700 - 850) (Eddy 1988). Within the Reservoir District, the five genetic phases constitute an on-going cultural tradition spanning 1,000 years of Anasazi evolution. With the addition of the Chimney Rock and Bonito Phase Outlier occupation, this village formative development is brought from the time of Christ up to the 12th century at A.D. 1125.

Research by the Museum of New Mexico's Navajo Project developed three primary themes:

1) culture ecology,
2) settlement patterning, and
3) population dynamics (Schoenwetter and Eddy 1964).

Paleo-ecological studies involved fluvial geomorphology, animal osteology, and palynology. These demonstrated a shift in seasonal periodicity of rainfall with a consequent effect on floodplain entrenchment, plant cover and small mammal distributions. Climatic reconstruction shows a change from winter-dominant precipitation before A.D. 775 to a summer-dominant rainfall after this time.

Anasazi settlement patterning indicated upstream movement of residence coupled with aggregation and the appearance of defensive stockades (Eddy 1974). Peak populations took place in the Piedra Phase with fall off through evacuation of the Reservoir District. The immigrant Arboles Phase peoples relocated higher up the Piedra River at the Chimney Rock Archaeological Area (CRAA). Entrenched draining of the river floodplain impacted flood water farming, causing leap frog relocation of farmers who passed upstream moving over the heads of unaffected, upstream neighbors. Stockades, burned dwellings, cannibalism, and mass graves all attest to the bitter nature of internecine warfare.

SOUTHERN UTE PROJECT: 1969, 1970, 1973

Approximately 45,000 acres were surveyed by the University of Colorado over a three summer period. This site inventory was conducted under contract from the Southern Ute tribe and recorded 226 prehistoric sites of the Rosa, Piedra, and Arboles Phases, covering an age range from A.D. 700 to 1050 (Adams 1975). The area investigated lies on the Southern Ute Reservation upstream and to the east of the Navajo Reservoir District. This research district is found along the San Juan River and in the uplands extending to Pagosa Springs.

The theoretical framework of this project centered on the subject of culture ecology. Human response to ecological variables, defined in the nearby Navajo Reservoir District, had to do with adaptation of Anasazi populations to climatic shifts. The major causal process for human adaptation to changing ecological conditions was immigration. The adaptive patterns were:

1) abandonment of the uplands,
2) increase in riverine population through akchin farming,
3) aggregation of population through increased site size,
4) increase in the number of special function sites, and
5) association of field-side sites with arable land (Adams 1975).

After A.D. 1050, immigrating populations moved upstream along the Piedra River to Chimney Rock under pressure of riverine entrenchment and declining floodwater farming.

CHIMNEY ROCK PROJECT: 1970-1972

Contract research was conducted by the University of Colorado at the CRAA over three summers. A combination of site survey and excavation revealed information on archaeological resources destined for restoration and tourist display (5AA83, 84, 86 and 88), as well as one mound (5AA92) subject to impact by the construction of an access road (Eddy

1977). This work revealed the presence of 65 sites made up of 217 residential and public architectural mounds. In addition, 27 transient camp/workshop locations were recorded like those defined by Adams (1975) for the Southern Ute Project.

The archaeology of these mesa-top ruins form the basis for defining the Chimney Rock Phase, now dated between A.D. 1000 and 1125 (Eddy 1977; Eddy 1988). In addition, the Chimney Rock Pueblo (5AA83) is interpreted as an intrusive Chacoan colony of the late Bonito Phase (Eddy 1977; Windes 1988).

GAP: 1973-1987

After the last Colorado field season, the 6.12 square mile scenic and scientific set-aside (CRAA) was closed and locked to archaeologists and public visitation. Reasons given had to do with conflict between the top priority Endangered Species Act and lower priority archaeological legislation. Although other considerations may have been at work, the public pronouncement was that nesting peregrine falcons would be disturbed by human presence.

This closure represented a major policy reversal for the San Juan National Forest, since planning for a public display at Chimney Rock had been underway since 1969. Further, important outdoor museum constructions had already taken place in tandem with the field investigations of the University of Colorado. These included ruins stabilization of sites 5AA83, 86, and 88, but not 84 or 92. The Guard House was exempted since archaeological testing had indicated that the building was too deteriorated for stabilization and display. In addition, most of 5AA92 had been destroyed by the construction of the access road and parking lot.

Closure of the CRAA continued for 14 years until a more favorable political climate prevailed. During this "gap" in archaeological investigations, little in the way of research was accomplished. The USDA Forest Service kept the entry-way gate locked, but did occasionally admit special visiting groups upon request. One such tour was given to the Colorado Womens' Club. Upon learning that there was no restroom facility at the parking lot, this Club donated $8,000 for the construction of a lavatory. With this facility built, the USDA Forest Service was under pressure to allow more general visitation. This was accomplished by USDA Forest Service student guides beginning in the summer of 1985. Chimney Rock was once again open to the public and ripe for archaeological exploration.

During this period of inactivity, several important events took place which affected the welfare of the CRAA. One of these was an attempt to break the integrity of the set-aside by coal mining; the other was a significant case of ruins vandalism (Eddy and O'Sullivan 1986). Effective lobbying by such special interest groups as the Colorado Council for Professional Archaeology, Colorado Archaeological Society, the Friends of Chimney Rock, the Colorado Open Space Committee, and the Sierra Club Legal Defense Committee led to the defeat of the coal mining effort while the "pot hunting" incident was curtailed by seizure of the prehistoric ceramic vessels and successful prosecution of the vandals (Eddy and O'Sullivan 1986).

On the other hand, the well-being of archaeology was not so assiduously served by the USDA Forest Service managers in a reburial issue. In the matter of the 11 Anasazi skeletons unearthed by the "pothunters," Native Americans petitioned to have the osteological remains turned over to them for reburial without scientific study. In a hasty decision made without regard for NEPA regulations, the bones were handed over to the Southern Utes for reinternment in a secret location. In this fashion, the largest skeletal find of Anasazi burials known from Chimney Rock was lost to science (Eddy and O'Sullivan 1986).

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Recent Research at Chimney Rock

Frank W. Eddy[1]

Abstract — Recent research is reviewed, including fieid work by the University of Colorado, the USDA Forest Service, and Fort Lewis College. Primary data is included on materials sourcing such as the identification of obsidian transported to Chimney Rock from southern New Mexico. Other topics include recent mapping and aerial photography and architectural studies.

Various small-scale archaeological studies have been conducted over the last three years (1988-1990). This report summarizes these efforts and the contributions they have made to the knowledge of Chimney Rock archaeology. These studies include research within and just outside of the Chimney Rock Archaeological Area (CRAA), Anasazi communities within the High Mesa Site Group, and sites down along the Piedra River. In addition to these data-based investigations, there are a number of topical studies including air photography, materials sourcing, geophysical prospecting, and archaeoastronomy.

AERIAL PHOTOGRAPHY

Two different sets of air photo coverage were recently obtained for the CRAA. The most recent of these was flown by the USDA Forest Service on August 3, 1989. This natural color mosaic has a 1:12,000 scale produced by a 6-inch focal length camera in two overlapping flight lines. Although no map has been prepared, it is anticipated that the Remote Sensing Laboratory, USDA Forest Service Regional Office, will be preparing map coverage in the future suitable as an archaeological base map of the entire CRAA (Dave Wolf, personal communication).

On August 4, 1984, a series of black-and-white panchromatic stereo airphotos was taken of the Chimney Rock Mesa at a scale of 1:6675. The transect of six overlapping aerial photographs was made by James Grady and Robert Hardwick of Hardwick and Associates. Coverage is provided extending from the Piedra River upslope to the Chimney Rock pinnacles. The uncorrected flight line was flown about 500 feet above terrain and encompasses a slightly skewed rectangle 0.9 by 2.3 miles in size. This air photo transect provides a 33.8% sample of the 6.12 square mile CRAA. All of the mapping efforts described below have been constructed from the 1984 photography of Grady and Hardwick. This coverage provides an incomplete reconnaissance of the still larger CRAA. However, its large scale provides a useful sample of natural and cultural features sufficient to extrapolate findings to the larger research district.

Air Photo Mapping

Two interpretive maps were prepared from the 1984 air photography. First, systematic air photo-interpretation was conducted by Dale Lightfoot (Mobley-Tanaka 1987; Lightfoot and Eddy 1989) during the spring of 1987. Use of a stereoviewer and 7-power handlens revealed 102 features thought to be evidence of Anasazi occupation. The majority of these are duplications of those first recorded by the 1970 ground survey, but 38 are totally new sightings not previously observed. These observations were prepared as a draft transect map suitable for field checking. After ground truthing was completed, a final map was prepared at a scale of 1:6675 showing verified prehistoric and terrain features not contoured by elevation. Symbols display the location of such prehistoric features as masonry surface mounds, pit-house depressions, jacal (burned) structures, jacal-pit house associations, excavated/stabilized ruins, trash/artifact scatters, check dams, cist (storage pits), and roasting pits. Coded terrain features include escarpments or cliff faces, streams or gullies, river meander scars, boundaries of the CRAA, and USDA Forest Service access roads. The upper portion of this map has been published in Malville and Putnam (1989: 47).

As part of the USDA Forest Service contract to Huerfano Consultants, James Grady prepared a second map in 1989. This provides a detailed topographic coverage of the High Mesa Site Group at a scale of 1:1200 (1 inch = 100 foot). This 60 cm

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contour interval relief map covers the upper and lower mesas including the Companion Chimney, Chimney Rock Pueblo, Guard House, causeway, excavated sites, and parking lot. Like the map of Lightfoot, the base aerial photography was the 1984 coverage taken by Grady and Hardwick; the map was drawn by the firm of Carrera and Associates. Archaeological annotations provided by Grady include each crater-shaped mound with either the highest point on the mound or lowest point in the depression. Like the aerial mapping of Lightfoot, Grady's map is highly suitable for settlement and demographic estimates because it displays each individual archaeological feature.

Ground Truthing

The first three weeks of CRAA study for the 1988 summer field season were focused on the 38 new air photo anomalies identified by Lightfoot (1987:appendix A). Through a great deal of exhaustive climbing, we were able to reach the location of 37 of these with the exception of Photo Point 10, which was not visited due to inaccessibility and location uncertainty. Much to our disappointment, all proved to be bogus interpretations. This is not to say that patterns and anomalies do not appear on the air photo prints, but rather that these have a natural, rather than a cultural, explanation. A synonymy of aerial observations and their natural explanations is as follows:

1) rectangular enclosures -- fallen trees, deer trails;
2) lope contour gardens -- cobble creep on steep slopes, game trails;
3) Anasazi roads -- old logging roads, fence lines, gullies;
4) check dams -- gully dump of rock debris during floods; and
5) circular mounds -- clearings in oak, clumps of oak, rock outcrops.

At the end of the 1988 field season, Lightfoot joined us for a field review of our ground truthing efforts. At that time, we revisited a selected number of air photo mapping points representing a variety of perceived patterns and anomalies. This rechecking was accomplished over a period of several days during the fifth week of the field program and confirmed in every way our earlier negative findings.

The sixth week was spent with Lightfoot ground checking the individual mounds containing residential architecture. It is these remains which formed the database first recognized in 1921 by Jeancon (1922) and recorded again for the settlement study conducted by Eddy (1977) in 1970-1972. The revised mound study of Lightfoot, on the other hand, allows a more accurate settlement and demographic statement since it is based on feature rather than site counts.

From a ground perspective, correlation of the air photo observations showed:

1) 63% of the mounds confirmed by both research approaches, and
2) 37% of the mounds not seen on the air photos but ground recorded.

On the other hand, from a photo-interpretive perspective:

1) 80% of the photo-recorded mounds were confirmed, and
2) 20% turned out to be bogus traces.

Thus, the ground-checked air photo study generated a 65% accuracy index. From the efficiency index/success rate, it is concluded that air photo interpretation makes a very important preliminary step in archaeological design and field research by providing direction to the field effort, but follow-up ground inspection is mandatory. Further, the degree of reliability will largely depend upon the ground experience of the photo interpreter as well as the nature and degree of vegetative diversity (Lightfoot and Eddy 1989: 120).

PIEDRA RIVER SITE GROUPS

Both site survey and limited excavations were conducted during the 1988 and 1989 summer field seasons (Eddy 1988, 1989).

Site Survey

Ground survey of river-bluff sites was conducted during the third and fourth weeks of the 1988 field season. The ground surveyed sites are all occupations of early Pueblo II age first recorded in 1970-1972. They extend from high Pleistocene benches on the north (5AA245), to those on the south (5AA134), forming the North and South Piedra Site Groups (Eddy 1977:fig. 4). Of these, 15 sites were revisited for purposes of remapping and recording of ceramics.

Several conclusions were reached. First, the sites date to late Pueblo I and early Pueblo II times (A.D. 925 - 1050) making them somewhat earlier than the mesa top sites of late Pueblo II age (A.D. 1000 - 1125). Second, the architecture is basically that of pit-house and associated jacal surface units forming bars, L-shapes, U-shapes, and, rarely, enclosed boxes. Third, various combinations of jacal and cobble construction are present on the surface units. Finally, many more residential units are present than recorded by the original site survey (Eddy 1977). In general, the masonry surface architecture reported by the survey teams of the 1970's was not confirmed, but rather pit-house villages of Arboles Phase configuration and make-up were found (Eddy 1966). Of outstanding importance is a large ceremonial pithouse (Big Kiva) with a 70-foot (21m) diameter found on 5AA246 and evidence of 2 cobble-constructed towers first dug by Frank H. H. Roberts, Jr. in 1921 (Mobley-Tanaka 1989b).

One new archaeological site was discovered dating between A.D. 925 and 1050. This site was found on private property at the mouth of a ravine named by us as Cabin Canyon. This multiple-unit occupation consists of five pit-house depressions with associated cobble-base surface units similar in settlement

make-up to many structures of the North Piedra Site Group. What makes the Cabin Site unique is its situation on and in a remnant of a Holocene Age terrace left by entrenchment of the Piedra River. Cobbles from one of the surface units are revealed by bank erosion as buried from 0.5 to 1.5 feet below the alluvial terrace surface. These observations indicate that the early Pueblo II Age occupation took place at a time prior to river downcutting so that from time to time the Piedra flooded the floodplain location of the Cabin Site, burying portions of the archaeological remains (Eddy 1974). Further study of this important site should reveal information on the history of the Piedra River and its relationship to Anasazi settlement and floodwater farming of that day.

In addition, several kinds of new archaeological features were discovered during the course of the summer's work. These include: roasting pits, slab-lined cists, and a defensive stockade. The roasting pits are marked by eroded scatters of burned rock (discolored red and heat fractured) used in cooking foodstuffs. Cists were identified by upright slabs, and in one case a "vandalized" pit was cleared of its fill by a pot hunter. These were likely extra-mural storage facilities for foodstuffs or equipment. Finally, a most unexpected feature was located, a linear wall crossing a saddle dip in a long natural ridge. This cobble-based structure bisected site 5AA108 with two nearby crater-shaped mounds. Similarity with circular, post-stockaded features excavated in the Navajo Reservoir District (Eddy 1966) suggest a defensive function as does the topographic position of the Chimney Rock wall which chokes off pedestrian movement among Sites 106, 107, and 108.

Test Excavations

Test excavations were carried out at two riverside pit-house sites of the Northern Piedra Site Group (Eddy 1977:fig.4). These bluff sites, 5AA245 and 5AA248, are of early Pueblo II age dating between A.D. 925 and 1050. They were investigated in order to obtain comparative data needed to functionally interpret households throughout the research district (Mobley-Tanaka 1989a; Eddy 1989).

5AA245

This site is a large pit house village located on the second Pleistocene bench along the left bank of the Piedra River. Excavations were conducted within a surface room, labeled Structure A in our field notes. This work was designed to obtain floor contact artifacts useful in a comparative study of prehistoric household activities. We also anticipated encountering tree-ring specimens in order to date the occupation including the Arboles Phase ceramic complex. However, surface evidence had misled us into thinking that the structure was burned when in fact subsurface examination showed the contrary.

Upon first viewing, Surface Structure A consisted of a low, cobble-strewn mound with oval shape and a north-south axis parallel to the bench bluff. The building was flanked to the east by a depression, perhaps 20 to 30 feet in diameter, which is the remains of an Arboles Phase pit-house.

The stratigraphic study of the mound indicates the following sequence of events:

1. A recessed floor, surface structure was first constructed. Excavation shows a finished floor and two, cobble-lined post holes discovered within the north-south profile line. A badly disintegrated burned log lay in contact with the floor against the south wall, but no fire basin or identifiable roof fall was discovered.
2. Next, this floor pit, which was incompletely traced out by the excavation unit, was filled with two layers of dark trash deposits separated by a layer of "false" sterile clay. The trash was probably dumped into the abandoned house pit from activities conducted elsewhere on the site, while the false sterile could have been clean-out from construction of the associated pit-house.
3. Finally, the dense litter of large size river cobbles on the mound surface is probably the remains of a collapsed surface unit. However, no walls or interior features could be defined, making this latter interpretation somewhat suspect.

5AA248

Part of a surface unit, labeled No. 1, is a cobble-covered mound, L-shaped, which partly surrounds a pithouse depression on the south side. Two components of occupation within the excavations were found with a stratigraphic history as follows:

1) a rectangular flagstone floor with exterior pits associated;
2) overlying is a layer of reddish brown loam speckled with charcoal flecks and occasional artifacts; and
3) a rectangular surface unit with definable walls made of river cobbles but no detectable floor.

In the southwest quadrant is a large pit underlying the cobble house, but not otherwise relatable to the flagstone structure. This pit, however, appears to predate the pithouse.

Check Dams

During the 1988 season, check dams were recorded of which three were sampled for evidence of domestic crops (Mobley-Tanaka 1990). These include:

1) two dams in a drainage lying just north of the North Piedra Site Group;
2) a series of nine dams found along the main drainage of Cabin Canyon; and
3) eight dams on an alluvial fan located in a tributary side drainage of Cabin Canyon lying just below sites 5AA246, and 5AA241.

All of these water control features were situated near the mouths of ravines which opened onto the Piedra River floor. These findings were discovered quite apart from the spurious upland reports of Jeancon (1922) and Lightfoot (1987).

The check dams consist of lines of cobbles whose purpose was to slow ephemeral run-off and catch fine sediment. Such soil-traps hold moisture and served as garden areas as indicated by the presence of corn (*Zea mays*) phytoliths in the retained soil. However, no fossil pollen, evidence of cultigens, was recovered. Soil samples were analyzed showing alkaline pH with values too high for corn agriculture today. Further, both nitrates and phosphorous deficiencies were noted by the Colorado State University Soils Testing Laboratory.

Ceramic Dating

Mobley-Tanaka (1990) examined the internal dating of the CRAA based on the ceramic complexes for each site. Her overall conclusions, based on the preponderance of corrugated pottery, is that all of the sites are Pueblo II in age and basically contemporary in age. The outside chronological limits, dating between A.D. 925 and 1125, are valid for both the riverside as well as the mesa top occupation.

Closer scrutiny of the changing potsherd frequencies along an elevational gradient, extending from the Piedra River to the High Mesa, shows a subtle shift from lowland to upland. Riverside sites have a greater frequency of late Pueblo I and early Pueblo II ceramics, whereas the upland sites have a somewhat greater preponderance of late Pueblo II pottery types. Based on this analysis, I would date the pit-house settlements of the lowlands between A.D. 925 and 1050, whereas the upland, circular masonry structures tend to date between A.D. 1000 and 1125. The critical overlap lying between A.D. 1000 and 1050 appears to date a settlement and population peak with a drop in numbers of people both before and after this time line.

HIGH MESA SITE GROUP

Investigations within the High Mesa Site Group were conducted during the fall of 1989 and throughout 1990 by the private firm of Huerfano Consultants under contract from the San Juan National Forest. Legal justification for the contract was the planned construction of a handicapped access-loop trail interconnecting the parking lot and 5AA88 (Truell 1975; Zeller and Matlock 1986).

Test excavations were carried out as a means of mitigating the subsurface archaeology, which would be impacted by the engineering of the handicapped trail. These subsurface "windows" provide a view of wall-fall and trash-dump deposits in stratigraphic succession. Finally, surface pickup of artifacts distributed along the 100-foot-wide trail right-of-way was performed in order to mitigate the effect of visitor collection. The specimens were collected for treatment through distributional analysis in three different kinds of studies:

1) contouring of numbers of specimens by artifact class;
2) contouring of sizes (weights) of specimens by artifact class; and
3) dirty-side-down records.

These distributional patterns will allow statements as to artifact and site taphonomy.

Guard House Excavations

A summer field school was conducted at 5AA84 by the Anthropology Department, Fort Lewis College. This 1988 program represents the third time that archaeologists have carried out excavations in the Guard House; the other two endeavors were those of Jeancon (1922:13-14) and Eddy (1977). In each case, some original deposits were cleared.

The 1921 work of Jeancon outlined the circular, one-room building which he named the Guard House. This name was attached to the site in light of its presumed function of controlling access across the causeway from the lower mesa to the sacred precinct of the Chimney Rock Pueblo. Clearing was again conducted during the summer of 1970, carried out at the request of the San Juan National Forest, in order to re-examine the building for purposes of visitor display. The meager remains led Eddy to reject the idea of outdoor museum display of the building.

Excavations of 1988 concentrated in the ventilator (or antechamber) and on the northeast curve of the wall. The latter section revealed a hard-packed clay floor and some intact sections of original wall. Following excavation, wall stabilization was carried out by the USDA Forest Service.

Experiments in Geophysical Mapping

The San Juan National Forest sponsored two geophysical experiments in subsurface mapping during the summer of 1988, using ground-penetrating radar and field induction coil. The radar unit was dragged over an unexcavated house (5AA86) to generate a profile of the fill down to the floor. The purpose of the induction coil was the underground detection of burned features, such as baked clay fire basins and construction clay. Less success was encountered by this instrument.

MATERIALS SOURCING

Two topical investigations into the sources of materials were carried out using X-ray excitation. One of these had to do with the origins of clay used in certain ritual items called feather holders (see the "Resource Distribution and the Chaco Phenomenon" chapter). The other was a pilot project into the sources of obsidian recovered by Fort Lewis College.

Obsidian Study

Three obsidian samples were submitted to the Obsidian Hydration Laboratory located at Eastern New Mexico University (ENMU) by Gary Matlock of the San Juan National Forest. Testing for materials source was conducted under the direction of John Montgomery. The chemical signature of the three specimens was obtained by X-Ray Fluorescence (XRF) with comparison to previously established sources within the state of New Mexico using Discriminant Function Analysis.

Provenance of the obsidian is from fill on or near the floor of the Guardhouse (Gary Matlock personal communication 1990) dated to the Chimney Rock Phase (A.D. 1000-1125). The specimens came from two identified sources in New Mexico: Jemez Mountains and Mule Creek. The Jemez Mountain locality is located in north-central New Mexico, whereas Mule Creek is found in the extreme southwestern part of that state. Exchange routes have been documented between the Navajo Reservoir District and the Jemez Mountains during Pueblo I times (A.D. 750 - 950), but the more distant quarries at Mule Creek have not been documented before.

ARCHAEOASTRONOMY

During the summers of 1988 and 1989, J. McKim Malville of the University of Colorado at Boulder, carried out archaeoastronomical studies within the CRAA (Malville and Putnam 1989; Malville, Ambruster and Jacobs 1988; Malville, Eddy and Abruster 1991). (See the "Clay Sourcing at Chimney Rock: The Chemistry and Mineralogy of Feather Holders and Other Ceramics" chapter.)

SUMMARY AND CONCLUSIONS

This paper was used as a medium to summarize recent research endeavors at the Chimney Rock Archaeological Area. These encompass both field efforts as well as topical investigations.

Survey was conducted down along the river where sites of the Piedra River Site Groups were revisited and mapped, and ceramics were surveyed. Our purpose was to identify the site types (pit-house/surface unit) and date the occupation. The settlement investigation showed that the 1970 survey was in error because complex masonry buildings are absent. In fact, the site type is that generally associated with Pueblo I developments like those reported so extensively in the Navajo Reservoir District (Eddy 1966). Furthermore, ceramic dating shows an early Pueblo II age (A.D. 925 - 1050). Site type and ceramic complex indicate an Arboles Phase rather than a Chimney Rock Phase occupation. With these considerations in mind, it seems more reasonable to restrict the Chimney Rock Phase to a late Pueblo II age between A.D. 1000 and 1125. Tucker's thesis (1981), in which founding settlements took place along the river only to be followed by a later upland occupational shift, is here supported.

Survey also revealed some previously unknown features. These include roasting pits, extramural cists, and a cobble-based defensive stockade. The latter is hypothesized to have functioned in controlling pedestrian traffic flow and also as a defensive structure in warfare.

Test excavations were carried out in several river-side sites. These were restricted to the digging of surface units which included structures with recessed floors, slab-paved floors, and rooms made of cobble and adobe construction. Other studies included survey, mapping, clearing, and sampling of check dams. The gardens were located near the floodplain floor of the Piedra River within side canyons. Environmental sampling revealed corn phytoliths but not fossil cultigen pollen.

Other excavations were conducted in the uplands. These include a third clearing of the Guard House, 5AA84. Surprisingly, original deposits still remain to be revealed in this structure. The control function of this building continues to offer a major interest to our understanding of Anasazi traffic flow.

Topical research subjects include aerial photo interpretation and mapping, geophysical prospecting, materials sourcing, and archaeoastronomy. Two sets of air photography were made; one by the USDA Forest Service and the other by a private firm. The smaller scale photography has not yet been converted into a map. On the other hand, the large scale photography has been employed in two different mapping ventures; one for the parking lot area and the other as a transect map extending from the Piedra River to the Chimney Rock pinnacles.

Experiments in subsurface mapping were sponsored by the San Juan National Forest. These include profiling of an unexcavated house using ground penetrating radar and a generalized search for subsurface baked clay using a field induction coil. The radar results were most promising.

Clay and obsidian sources were identified using two kinds of x-ray scanning. The clay source study investigated baked ritual items called "Feather Holders" with the intent of determining where these symbolic objects were manufactured (see the "Resource Distribution and the Chaco Phenomenon" chapter). Contrary to the favored hypothesis, it was not possible to demonstrate that the holders were made using clays from Chimney Rock. Some of the ritual items do show an elemental composition like Chimney Rock pottery while other ceramic lots are unrelated to the Feather Holders. Obsidian sourcing shows the presence of Anasazi trade routes extending far to the southwest into what is now central and southern New Mexico.

Finally, Malville has convincingly demonstrated the use of a horizon calendar at Chimney Rock using various residential sites as back-sighting positions and the natural Chimney Rock pinnacles as foresights (see the "Chimney Rock and the Moon: The Shrine at the Edge of the World" chapter). These alignments show significance for both the sun and moon where they likely scheduled both agricultural activities (planting, cultivation, and harvest) as well as agricultural ritual involving celebrations of these same food production tasks. In addition, these findings provide further support for the ceremonial role of the Chimney Rock Pueblo, which was constructed in two phases coordinated with the northern major lunar standstills during the 11th century.

ACKNOWLEDGMENTS

Special thanks for hospitality are given to Don A. Drennan, owner, and John Huffmeyer, manager, of the Rafter-T Ranch, where we camped for the two summer field seasons of 1988 and 1989. This private land holding is conveniently located in the Piedra River canyon with access to the Piedra River Site Groups that straddle the property boundary with the CRAA, San Juan National Forest.

Chimney Rock and the Moon: The Shrine at the Edge of the World

J. McKim Malville[1]

Abstract — The moon at the major standstills of A.D. 1076 and 1093 rose between the two pinnacles of Chimney Rock as viewed from the Chimney Rock Pueblo. Construction dates coincided with major lunar standstills. Chacoans may have joined indigenous populations because of the site's importance as a major regional shrine with significant astronomical associations. Spectacular equinox sunrises between the pinnacles, as viewed from 5AA8 on Peterson Ridge, may have stimulated occupation of that area as a source of calendrical information and esoteric astronomical knowledge.

Astronomical symbols have long played central roles in the human search for meaning and purpose. Astronomical rhythms have also supplied the calendrical framework for periodic affirmations of meaning and order in the cosmos. It should come as no surprise that astronomy provides a lens with which to view the ceremonial aspects of an ancient culture. Those non-utilitarian activities are frustrating to archaeologists because they leave either ambiguous traces or no trace at all in the archaeological record.

Research programs in the natural sciences function most effectively when hypotheses are energetically tested and used as learning strategies. The interdiscipline of archaeoastronomy is no exception. In that spirit, the value of a hypothesis in archaeoastronomy should often be judged not only by the ease with which it can be disproved, but also by its success in stimulating the discovery of new facts within the archaeological record and in provoking new questions about the nature of the culture. Since astronomy is but one of a number of possible factors influencing the organization of space, a well-balanced archaeoastronomical investigation must expand beyond an exclusive consideration of astronomical topics to include the possible roles of major cultural forces which can organize archaeological space such as mountains, unusual rocks, caves, springs, rivers, and other archaeological sites.

In searching for meaning embedded in structures, we must assume those responsible for the design and construction of spatial order had a coherent, although not necessarily explicit, set of meanings and associations with which they worked (Fritz 1978). We also must assume they were successful in creating forms which embodied some of those meanings and associations. Exactly what was in those ancient minds causing them to organize space in a particular manner we shall never know. Indeed, they may not have known themselves in the sense of having a single, explicit plan. Multiple hypotheses are thus not inappropriate consequences of our explorations, and even robust testing may leave several interpretations equally credible.

A particular site may have been utilized for special ceremonial activities because of its association with unusual material objects, unique local geography, or the occurrence of a significant (terrestrial or celestial) event. Especially in the Southwest, particular mountains, springs, and caves have become sacred shrines because of identification with Puebloan creation and emergence events (Ellis and Hammack 1968; Tyler 1964). Such sites are clearly unique as they cannot be moved or duplicated elsewhere. Chimney Rock may have been such a shrine.

The Chimney Rock Pueblo (5AA83) is not a typical Chacoan Outlier. Its remoteness indicates that it was not a participant in the mainstream activity of the Chacoan regional system. Of the 30 outliers described by Powers et al. (1984), Chimney Rock is the most remote from the nearest outlier, the highest, and the most distant from water. The route to the Pueblo along the narrow, upward slanting causeway, past the Guardhouse

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(5AA84) suggests entry into an unique, private, and sacred territory. This remote, high space adjacent to the spectacular pinnacles of Chimney Rock may have been chosen as the site for an outlier primarily because of its sacred geography. Ethnographic accounts do indeed reveal that the Chimney Rock area was considered to be a shrine by members of the Taos Pueblo (Ellis 1969; Ellis and Brody 1964).

It is possible that prior to the construction of the Chimney Rock Pueblo, the high mesa was recognized by the local population as a special place, functioning as a shrine for observing the moon and sun. In this paper I suggest uniqueness may be the key for understanding Chimney Rock. The two structures of the high mesa, the Chimney Rock Pueblo and Guard House, may have been primarily ceremonial in nature, constructed at that particular location because of proximity to those unique rock formations and the lunar and solar phenomena for which they served as a foresight.

THE MOON AND ITS CYCLES

Few cultures have not been enthralled by the moon and its metaphors; fewer still have not used lunar cycles for regulating its days and dividing the year into convenient parcels of time (Eliade 1958).

Two cycles have predominated in lunar calendars: the 29.5 day synodic period of lunar phases and the 19-year Metonic cycle (the period with which a given phase of the moon recurs at the same date of the year). For example, the Babylonian calendar was based on a lunar month which began with the first crescent moon. Intercalary months were used to bring the lunar calendar into synchronization with the solar seasons, and the Metonic cycle of 19 years was used as the basic correcting device. The 19-year cycle was also used by the Greeks as early as the 6th century B.C. and is currently utilized in the Jewish lunar calendar.

The moon is more than simply a convenient time-keeping device. In its waxing and waning, it is a body whose life appears to be subject to the same universal law of birth and death as that of human life. For three nights every month the sky is without a moon, but the death of the moon is never final and the new moon is followed by the rebirth of a slender crescent in the west just above the setting sun.

This perpetual return to its beginnings every 29.5 days makes the moon the unique heavenly body associated with time and the rhythms of life. No other heavenly body provides so tangible a set of cycles or so accessible a cosmic rhythm. The most evident of all cosmic periodicities, the cycles of the moon gives explicit demonstration of the "intimate parallelism" (Wheatley 1971) of heaven and earth. These are the cycles that allowed imitation of celestial archetypes by ancient peoples (Eliade 1965) and became religious symbols expressive of the order of nature (Geertz 1973).

Attention to the changing phases of the moon by a community which used a lunar calendar should have readily revealed the ever-changing position of the moon on the horizon. During each month, the rising moon swings between its northern and southern standstill positions; two weeks after the moon rose farthest to the northeast it will rise farthest in the southwest. The angular distance between these two standstill positions changes slowly with a period of 18.61 years. Every 18.61 years the angular distance is greatest and that event is known as a major standstill. After 9.3 years the angular distance is smallest, and that event is the minor standstill. The increasing and decreasing separation of its monthly standstill positions, occurring upon an irregular horizon, could have been easily detected by sharp-eyed observers in the clear skies of the Southwest.

Ethnography of the historic Pueblos suggests that the most important astronomical event involving lunar standstills may have been the rising of the full moon at its northern extreme at the time of winter solstice. Near the time of winter solstice, there was apparently concern among the historic Pueblos that the sun would not reverse its southerly direction and the earth would consequently remain locked in winter (Ellis and Hammack 1968; Zeilik 1985b, 1986b). For example, the Zunis attempted the difficult task of organizing their calendar such that winter solstice festival, Itiwana, occurred at or near full moon (McCluskey 1989; Zeilik 1986). Generally, the symbolism of the balance of the weak sun at winter solstice and strong, full moon appears to be important for the Pueblos.

The Zuni lunar-solar calendar required careful observation of the phases and motions of the moon. Following winter solstice by 10 days was the New Fire Ceremony. Prayer sticks were planted at the first full moon after that ceremony and for the nine successive full moons. While the first appearance of the slender crescent moon after new moon is an easily identifiable event, the exact day of full moon is more difficult to establish. One consistent approach would be to define the moon as full when it rises in the direction exactly opposite the direction of sunset (McCluskey 1989). Thus one could look for the moon rising in line with one's shadow cast by the setting sun, drawing further attention to the location of the rising moon on the horizon. The mid-October full moon started a 49-day countdown to the Shalako festival. During that time, prayer sticks were planted at 10-day intervals, again guided by the careful observations of the moon. Whatever the exact method used to establish the date for planting prayer sticks, it is very likely that throughout the year at Zuni, the position of the moon on the horizon would have been examined minutely and its periodic behavior discovered. The moon may have received similar attention at Chimney Rock.

LUNAR STANDSTILLS AT CHIMNEY ROCK

The full moon at major standstill rises between the double spires of Chimney Rock near winter solstice as viewed from the vicinity of the Chimney Rock Pueblo (Malville et al. 1991) (figs.

1 and 2). The lunar standstills at Chimney Rock rank as some of the more spectacular natural phenomena in the heavens. For a period of nearly 2 1/2 years around the time of major standstill, the moon rises between the chimneys on one or two days every month as seen from the vicinity of 5AA83. Starting with a slender waning crescent in July, approximately a month after summer solstice, the moon grows in size each month when it is visible between the double spires. Each month it rises between the spires earlier during the night until finally it appears just at sunset as a full moon near the time of winter solstice.

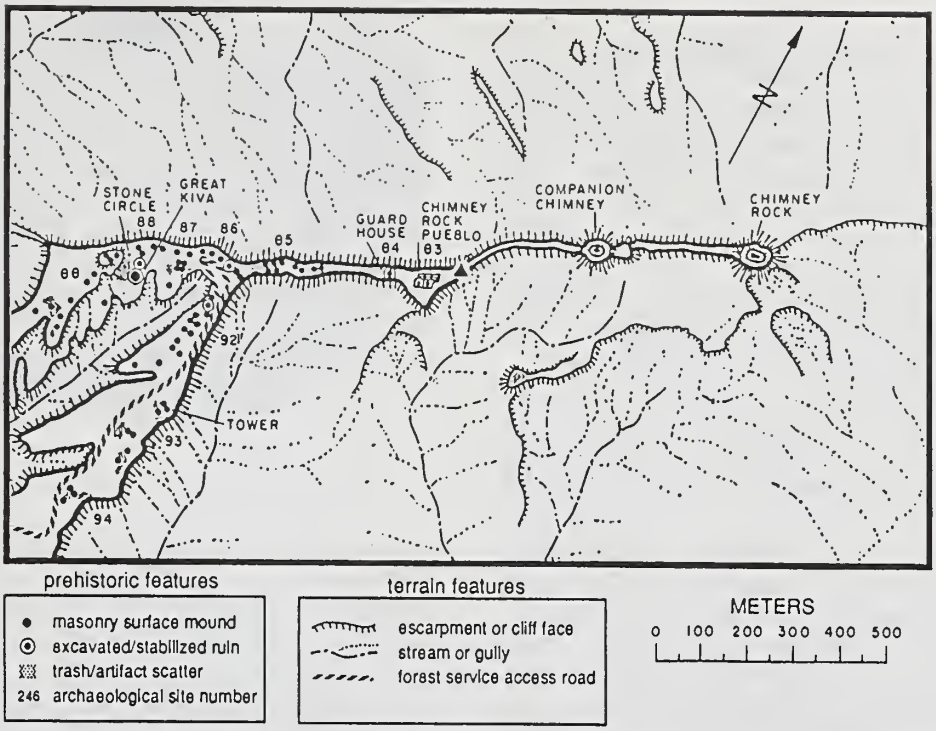
The phenomenon is so spectacular that it is not easily forgotten; it is sufficiently frequent that an occasional cloudy night does not prevent its detection. The rhythm of these six successive moonrises should have provided an opportunity for anticipation of the phenomena and may have confirmed the predictive power of the priests as well as the order of the heavens.

The full moon rising between the double chimneys near the evening of winter solstice may have been the major astronomical event of the area. It may have provided not only the setting for a major festival, but also the opportunity for the necessary adjustments to the lunar and solar calendars.

During the period of its occupation, the Chimney Rock Pueblo may have been a center that drew ceremonial activity inward and radiated ritual and calendrical information outward through the Chacoan world. The knowledge of the spectacular lunar standstills at the shrine of Chimney Rock was probably possessed by the local population prior to the construction of 5AA83. As a result of its construction, the isolated and dramatically high mesa may have become an important element in a communication network and a pilgrimage destination point.

Were there actually people on the high mesa near 5AA83 who could have observed the moonrises between the chimneys? The answer is clearly in the affirmative. The dates of major standstills in the latter half of the 11th century are readily calculated: 1056-1058; 1074-1077; 1093-1095 (Malville et al. 1991) (Table 1). Cutting dates of logs taken from the East Kiva, and room 8, are exclusively either 1076 or 1093 (Eddy 1977). The 1076 date comes from only one beam associated with the lower ventilator tunnel of the east kiva. That dendro-date is given an "r" rating, indicating that the outermost ring of the pole was continuous, and it is designated a "possible cutting date". Since the beam is associated with the lower of the two ventilator tunnels, it is likely that it was associated with the first of the two major episodes of construction at the site. The second date is established by 17 well-dated specimens. Of these, 15 are 1093r and 2 are 1093cB, meaning that there was a continuous bark indicating a "definite cutting date". The second date may correspond to a major reconstruction of the Pueblo when the floor of the east kiva was raised, the higher ventilator shaft was built, and room 8 was re-roofed. Of these two dendro-dates, 1076 is more suspect; the single beam with a 1076r date may have been reused from another structure. There are, however, no other structures on the Chimney Rock mesa with dendro-dates of 1076r, and at present the most parsimonious

Figure 1. – Moonrise above Chimney Rock, August 3, 1988, 3:00 a.m.



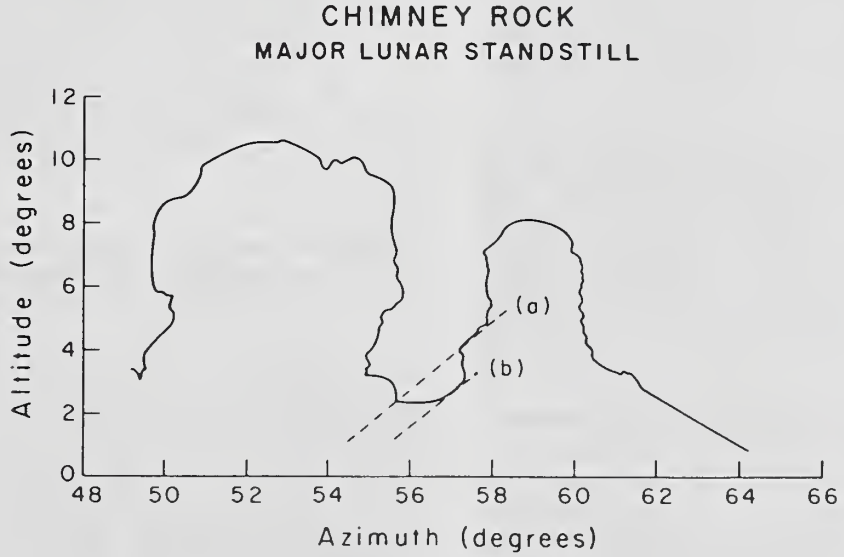


Figure 2. – Chimney Rock as seen from a location northwest of 5AA83. The triangle on the upper diagram indicates the site from which the photograph of the rising moon was taken during the major standstill. The paths of the center of the moon (lower diagram) are shown at two declinations (a: 28.7°; b:27.9°).

hypothesis is that only two building episodes occurred at 5AA83 during the years 1076 and 1093.

The agreement of the dendro-dates and astro-dates suggests that 5AA83 had been built specifically to celebrate lunar standstills. As indicated in Table 1, construction of the Chimney Rock Pueblo may have been initiated before the standstill full moon of December 13, 1076. By that time standstills had appeared between the chimneys during the two previous years, and the populations of both Chimney Rock and Chaco Canyon would have been alerted to the phenomena.

Table 1. – Chronology of Chimney Rock

1056.0 - 1058.4
Full moon rising between the chimneys: Dec. 25, 1056
Full moon rising between the chimneys: Dec. 14, 1057
Winter solstice: Dec. 15.6, 1057
1074.6 - 1077.0
Full moon rising between the chimneys: Dec. 6, 1074
Full moon rising between the chimneys: Dec. 25, 1075
Solar eclipse: March 7, 1076
Cutting of trees for 5AA83: July - Aug. 1076
Full moon rising between the chimneys: Dec. 13, 1076
Winter solstice: Dec. 14.2, 1076
1093.2 - 1095.6
Cutting of trees for 5AA83: July - Aug. 1093
Full moon rising between the chimneys: Dec. 5, 1093
Full moon rising between the chimneys: Dec. 24, 1094
Full moon rising between the chimneys: Dec. 14, 1095
Winter solstice: Dec. 15.8, 1095

The nature of lunar standstills could have been part of the esoteric knowledge of a Chacoan priesthood. The 29.5 day synodic period allows a prediction of each new and full moon; a 27.3 day period separates each successive standstill moon; the 18.6 year standstill period allows a prediction of the next standstill cycle and establishes the 173.3 day period between successive eclipse seasons.

Standstills that occurred earlier in the century may have initially acquainted the Chimney Rock populations with the lunar phenomena. Each of the major sites of the lower mesa excavated by Eddy (1977), 5AA86, 5AA88, and 5AA92 (respectively the Parking Lot, Ravine, and Access Road sites) contained timbers dated from 1056 or 1057, cut during the third major standstill of that century. Perhaps it was during those standstill moonrises that a series of events was set in motion resulting in the construction of the Chimney Rock Pueblo in time for the fall and winter moonrises of 1076. The standstills of 1056-57 occurred some two years after one of the most eye-catching astronomical events of the millennium, the explosion of the star in Taurus in July 1054 which resulted in the Crab Nebula. The supernova was visible during the daytime sky for approximately three weeks and continued to be visible in the night sky for nearly two years. The decade of 1060 had further astronomical spectaculars: an annular eclipse of the sun was visible in Chaco Canyon on December 3, 1062, and Halley's Comet appeared in 1066. These events may have caused the Chimney Rock and Chacoan populations to pay special attention to events taking place in the heavens.

Two Rosa Black-on-white seed jars, dating from early Pueblo I times, may indicate lunar ceremonialism among the Chimney Rock population prior to the commencement of

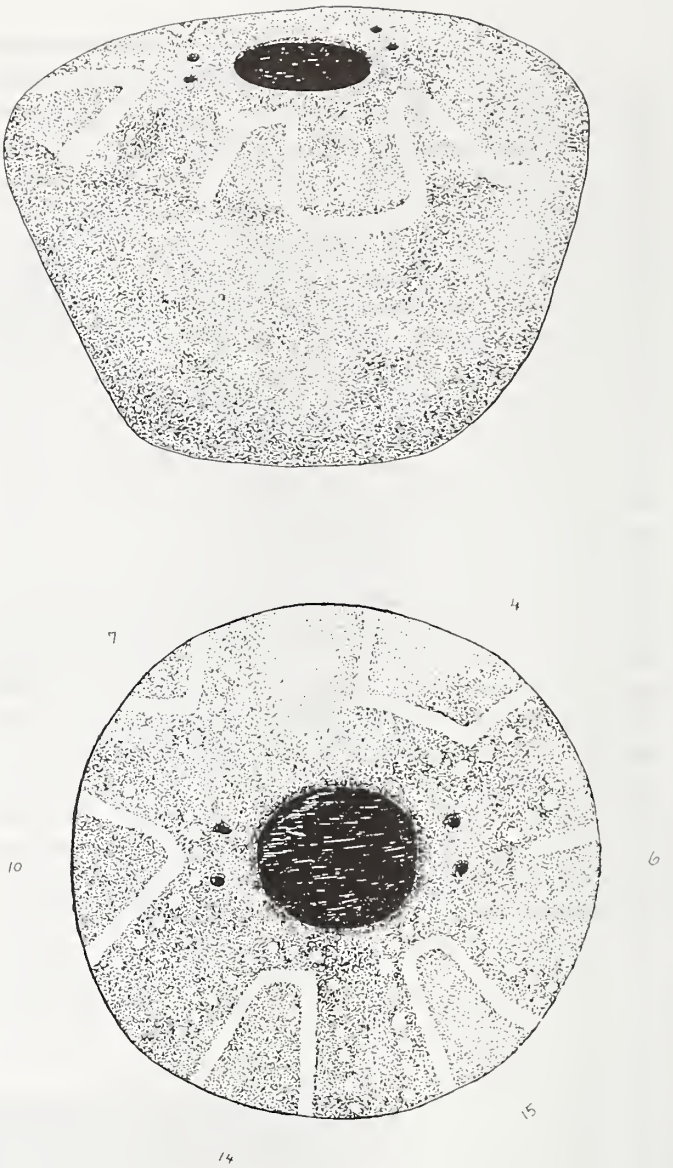


Figure 3. – Rosa Black-on-white seed jar. Decoration may be a representation of the double chimneys and the 29-day synodic period of the moon.

Chacoan influence. A decorated seed jar from Chimney Rock found during the 1924 field season includes what appears to be the profile of the double chimneys and is surrounded by 29 dots (fig. 3). The pattern may have been purely decorative outlining, but it is worthy of note that the synodic period of the moon, the time from new moon to new moon, is 29 1/2 days. Another seed jar obtained during the same field season contains 11 holes along its rim. While four holes are not uncommon for the rims of seed jars, the number 11 is unusual and is, of course, the number of moons between the end of one annual month-long festival and the start of the next. The seed jar may have functioned as a counting device in a manner similar to calendar sticks (Marschack 1989; Zeilik 1986b).

If other cultures are useful guides, the moon may have had many levels of meaning for the people of Chimney Rock and Chaco Canyon. It could have been a cosmogonic symbol, a

metaphor for time, a practical calendrical device, as well as an animate being who influenced human experience. It is also possible that the standstill moon was used to predict the dates of eclipse seasons. At the time of major or minor standstills, eclipses are confined to approximately 30-day periods around the vernal and autumnal equinoxes; the total eclipse of 1076 (table 1) occurred during the eclipse season of vernal equinox. Eclipse seasons move through the days of the year with the 18.61 year period, following one another by 173.3 days. A tradition of lunar observing and associated oral transmission could conceivably have allowed detection of the pattern of solar and lunar eclipses over several standstill cycles.

Other Astronomy at Chimney Rock

The original hypotheses that led us to investigate the astronomy of Chimney Rock in the summer of 1988 were that the sun, the moon, or Venus might rise between the chimneys as seen from 5AA83. Venus never rises sufficiently far north to fit into the gap. Similarly, the view of the rising sun from 5AA83 of the rising sun at summer solstice is blocked by the eastern chimney. However, we must not dismiss too readily the possibility of solar symbolism at the site. The spine of the high mesa running southwest from the double spires has an orientation approximately in line with the direction of summer solstice sunrise. On mornings close to summer solstice, the northeastern spire is dramatically backlit by the rising but invisible sun, and perhaps the sun was perceived to be in his northern house at that time.

Another opportunity to use the double pinnacles as a foresight exists to the west, across the valley on the Peterson Ridge above the Piedra River. On that ridge there are 12 sites (Webster 1983) each of which would have provided a view of sunrise in the gap between the chimneys at various times of the year. The largest site in the group, 5AA8, was identified by Webster (1983) as the probable political and ceremonial center of that community. Built on a conspicuous knoll along the ridge, it contains three kiva depressions and the remains of a two-story room block (fig. 4). The structure is unusual in that it is oriented to the east rather than, more typically, to the south or southeast. While the ridge bears some 13° west of north, the west wall of the structure is within a few degrees of north-south, and the courtyard is open to the chimneys. The chimneys and 5AA8 are separated by 3 km and are almost exactly on an east-west line. There are other knolls on the ridge where the Pueblo could have been built; that particular knoll may have been chosen so that 5AA8 would be in a cardinal relationship with the double chimneys. The inhabitants of the site would have been treated to the remarkable spectacle of the sun rising between the double spires twice a year, near the equinoxes. Such events would have been valuable for maintaining an accurate ceremonial calendar and would have provided compelling visual spectacles.

Perhaps just as significant, and equally as dramatic, would have been the frequent moonrises occurring between the spires. These spectacular apparitions would have provided another set of lunar cycles, and for those living at 5AA8 another body of esoteric knowledge would have been available. The time between successive moonrises between the spires is 27.3 days rather than the 29.5 days between new moons. As a consequence, the phase of the moon that rises between the chimneys as seen from 5AA8 changes throughout the seasons.

At equinox the full moon appears between the chimneys while at the solstices the half-illuminated (first and third quarter) moon is present every two weeks in the gap.

On the summit of Pyramid Mountain, 3 km to the southeast of 5AA8, is the third high community of the Chimney Rock Archaeological Area, 5AA129, which Eddy (1977) suggests was another major ceremonial center for the area. On the summit of the mountain are seven mounds contained within a rectangular compound covering approximately 200 m^2. The three high structures 5AA83, 5AA8, and 5AA127 form a nearly equilateral triangle with sides averaging 3 km. They may have formed a signalling network, for together the three sites provide the possibility of line-of-sight communication to the majority of sites within the Chimney Rock Archaeological Area. Announcements of ceremonial activities at the Chimney Rock Pueblo could thus have been communicated through this network.

There is evidence of an interest in a solar horizon calendar at the Chimney Rock mesa. To the south of the Chimney Rock Pueblo, near 5AA92, the sole tower on the mesa provides access to a distant and sharply serrated eastern horizon along which the sun rises from summer to winter solstice (fig. 2). The tower is located at approximately the highest point of the mesa from which the view of the distant horizon, at the position of summer solstice sunrise, is not blocked by the chimneys. It has also been built at such a location that at the time of winter solstice, the sun rises over an isolated butte containing the site 5AA254 containing 2-3 kiva depressions. The center of the southernmost and largest depression has an azimuth of 119° 54′ as seen from the tower, differing from the estimated position of the first gleam of winter solstice sunrise by approximately 1° 30′. This remote site may have served as a sun shrine associated with winter solstice.

ASTRONOMY OF THE CHACOAN REGIONAL SYSTEM

The presence of the Chacoan structure at the shrine of Chimney Rock suggests that Chacoan society considered the astronomical phenomena associated with that site to be important and that they may have wished to incorporate that shrine into their astronomical traditions. Evidence for two major kinds of observational astronomy has emerged from archaeoastronomical studies at Chaco Canyon and its outliers. These two astronomies involve (1) orientations of structures and roads, and (2) the light and shadow phenomena of Fajada Butte.

The cardinal alignments evident at Pueblo Bonito, Hungo Pavi, Pueblo Alto, Tsin Kletzin, Casa Rinconada, and the Great

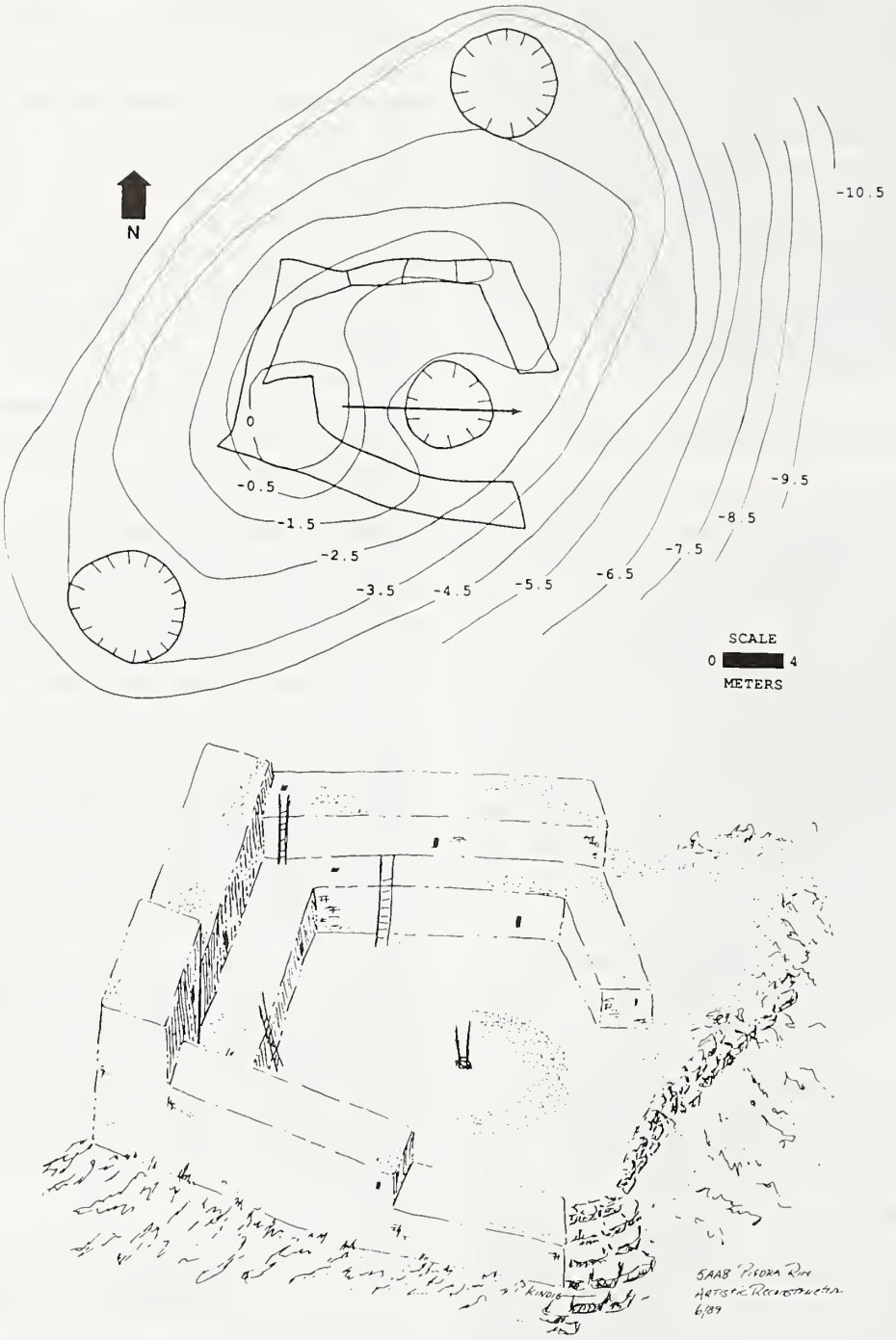


Figure 4. – Map of 5AA8 on Peterson Ridge (upper diagram) and artist's reconstruction (lower diagram) by Jean Kindig.

North Road demonstrate an ability to establish true north with a precision of a solar diameter (30′) or better (Sofaer et al. 1989). The most accurate alignment to cardinality is the north-south wall of Pueblo Bonito which lies only 16′ away from true north.

Orientations of other great houses in the Canyon and in outliers to solstice and lunar standstill positions have been reported by Sofaer, Sinclair, and Donahue (1989). The majority of the astronomical orientations are to the approximate directions of major and minor lunar standstills, while only Aztec is associated with solstice sunrise. The line containing the three earliest great houses constructed in the first half of the ninth century, Penasco Blanco, Pueblo Bonito, and Una Vida, is aligned with the Chaco Wash and approximately with the rising moon at major standstill. Penasco Blanco, the largest great house

sited above the canyon floor, provides an especially dramatic view of full moon rising at winter solstice just above the Canyon at the times of major standstill.

The accurate cardinal alignments of great houses, great kivas, and roads indicate the presence of a well-developed observational technology. Those responsible for planning and construction of those sites must have been acting from positions of both astronomical knowledge and social power. The second major manifestation of astronomical activity amongst the Chacoans is the unique three-slab site of Fajada Butte (Sofaer et al. 1979, 1982) and its light and shadow phenomena. It is unclear whether the present configuration of the slabs is the result of a natural rock fall or intentional design and construction. Evidence for an interest in the cycles of the moon clearly emerges from the site. The large spiral has 9 1/2 turns (19 grooves along a diameter), which may indicate knowledge of the Metonic cycle of 19 years and/or the 18.61 year lunar standstill cycle. At the time of minor northern standstill, a moonshadow bisects the spiral at moonrise. The shadow just touches the petroglyph's left edge during major northern standstill, an event confirmed at the lunar standstill of 1987 (Sinclair et al. 1987). At both places on the petroglyph where major and minor standstills are marked by light, straight grooves have been pecked which are parallel to the moon's shadows. Since these two grooves, parallel to the moon's shadow, do not have the same angle as the shaft of sunlight, it does seem very likely that Chacoan astronomers were aware of the major and minor standstills of the moon.

The lunar effects at Fajada Butte are too subtle to have stimulated by themselves the intense interest in lunar standstills which appears in the Chaco region. Only during approximately one week in four, when the moon is between full moon and last quarter, would the light of the moon, low in the eastern sky, be sufficient to cast a noteworthy shadow on the spiral petroglyph. During the two weeks between new moon and full moon, the moon rises only in the daytime sky, hence no obvious shadow would be formed by the moon. The waning moon after third quarter would generate only a dimly seen shadow. Haze on the eastern horizon would further diminish the effect. Standstill events at Chimney Rock may have provided the natural stimulus for an interest in lunar standstill in the Chaco world.

CONCLUSIONS

At the northeastern edge of the Chacoan world, the high mesa of Chimney Rock may have served first as a local and then as a system-wide shrine, providing the natural backdrop and inspiration for a variety of ceremonial and astronomical activities associated with the moon and sun. For some time prior to the building of 5AA83, local populations may have been aware of the astronomical attributes of the area and Chacoans may have traveled north to construct the Chimney Rock Pueblo during the lunar standstill of 1076 in order to share in that combination of astronomy and ceremony.

The astronomy of the Chimney Rock area required the double pinnacles as a foresight. These dramatic features probably possessed sacred attributes independently of their functions as solar and lunar foresights. As is often the case for the establishment of sacred sites, the construction of the Chimney Rock Pueblo on the High Mesa may have been motivated by a multiplicity of meanings, one of which was astronomical.

Alternate models for the Chimney Rock Archaeological Area need not, of course, be mutually exclusive. Astronomy may have been practiced on the High Mesa and on Peterson Ridge while logs were cut and floated down the Piedra River for inclusion in the great houses of Chaco Canyon. The Chimney Rock Pueblo may have served other ceremonial functions than those associated with the standstill moon.

It is, of course, possible that we are dealing with coincidences: the agreement of cutting dates of timbers in 5AA83 with those of lunar standstill may be fortuitous; the Chimney Rock population may have never seen the moon or sun rising between the chimneys; they may have never realized the astronomical attributes and calendrical power of the area; the interest in solar and lunar phenomena evident in Chacoan society may not have extended to its remote outlier at Chimney Rock.

Of one thing we can be certain, the use of ethnographic analogy as a learning strategy has been successful in leading us to a number of discoveries:

1. At the time of major lunar standstills, the moon rises between the Chimneys as viewed from the Chimney Rock Pueblo. The dates of the last two lunar standstills in the 11th century correspond to possible cutting dates of beams in 5AA83.
2. The major structure on Peterson Ridge, 5AA8, is nearly due east of the Chimneys. Opening to the east, it provides a view of the sun and moon rising between the Chimneys. The rising of the sun at vernal and autumnal equinoxes provided the opportunity for precise calendrical observations. The rising of the sun between the pinnacles as viewed from other sites along the ridge would have established further calendrical dates between equinoxes and summer solstice.
3. The sole tower of the Chimney Rock mesa at 5AA92 has been built at a location suitable for a sun watcher to establish a horizon calendar; from the tower the sun rises at winter solstice across the site 5AA254.

FUTURE WORK

Can the hypothesis that the Chimney Rock Pueblo served as a shrine for lunar and solar ceremonialism continue to function as a learning strategy to lead us back into the archaeological record? A very obvious test of the hypothesis would be to search for additional beams in 5AA83 that can be dated. For example, an impressive result would be obtained if beams are found which date to the standstill of A.D. 1111. If the construction of the Pueblo was only associated with lunar standstills, then dates associated with beams in the structure should be limited to the three major standstills between A.D. 1076 and the end of the Chimney Rock phase which Eddy estimates to have occurred about A.D. 1125. If 5AA8 on Peterson Ridge and 5AA27 were part of a communication network, there may be common dates from all three of those sites.

What are the archaeological correlates of the ceremonialism proposed for 5AA83? The feather holders found in the Chimney Rock area must have been ceremonial objects. The fact that they were limited to 5AA83 and other sites of the high mesa (5AA85, 5AA88, and 5AA92) points to the ceremonial utilization of the high mesa. The 29 metates found in room 11 of 5AA83 appear to be items stored for occasional community ceremony. The guard house 5AA84, which limits access to the upper mesa, again indicates a special use for the high mesa. Because of their inconvenient and precarious locations, the sites built along the narrow causeway, 5AA86, may also have been associated with ceremonial rather than domestic activities, and further investigation of them may reveal additional correlates of ceremony. A re-examination of the midden near 5AA83 may indicate ceremonial behavior similar to that attributed to Pueblo Alto, such as breakage of ritual ceramics.

ACKNOWLEDGMENTS

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Clay Sourcing at Chimney Rock: The Chemistry and Mineralogy of Feather Holders and Other Ceramics

Mary Sullivan[1] and J. McKim Malville[2]

Abstract — The sourcing of feather holders and ceramics from Chimney Rock, Pueblo Bonito, and Wallace Ruins as well as clays from Chimney Rock and Chaco Canyon were undertaken by means of X-Ray Diffraction and X-Ray Fluorescence spectroscopy. Of the 17 feather holders known in the Anasazi world, 11 are from Chimney Rock. The presence of chlorite in the Chimney Rock clays and its absence in the feather holders means that the clay source for the feather holders has not yet been found at Chimney Rock. The presence of separate chemical clusters of the feather holders and ceramics suggest 13 ceramic technologies and traditions within the Chimney Rock area.

The pinnacles and high mesa of Chimney Rock, regarded as a sacred shrine by members of the Taos Pueblo (Ellis 1969; Ellis and Brody 1964), may have functioned as a shrine prior to the construction of the Chimney Rock Pueblo 5AA83. For a period of approximately 50 years, from the time of its construction in A.D. 1076 until its abandonment around A.D. 1125, the high mesa may have been the scene of ritual activities associated with the Chimney Rock Pueblo. The Chimney Rock Pueblo may also have served to integrate the eight settlements of the area into a local community and to incorporate that community into the larger Chacoan system. The size and distinctive design of 5AA83 suggest its construction was a community project, as it is unlikely that it could have been built without the cooperation of the local population. Nor does it seem likely that it was built without some form of contact with the Chacoan system.

The nature of the contact between Chimney Rock and Chaco Canyon may be explored through the analysis of ritual artifacts found at both locations. One type of object which appears to be especially useful as a diagnostic tool for ritual interaction was originally identified by Judd (1954) as a feather holder (fig. 1). Only 17 of these small and sturdy objects have been identified within the Anasazi culture area and could have been transported easily. Judging from their abundance at Chimney Rock, they may have been dispersed outward from that outlier by individuals who visited it. Alternately, they may have been manufactured elsewhere and brought to Chimney Rock to be used in specific ceremonial activities.

The initial goals of this study were to identify the source of the feather holders utilizing two common techniques of clay mineralogy, X-Ray Diffraction, and X-Ray Florescence spectroscopy. Once the origins of these objects were established, we hoped to investigate the dynamics of the interaction between Chaco Canyon and Chimney Rock.

FEATHER HOLDERS

Of the 17 identified feather holders, 11 were found at Chimney Rock. All of the Chimney Rock feather holders came from sites on the High Mesa, 5AA88, (4); 5AA92, (3); 5AA85, (2); and 5AA83, (2). Of the remaining six feather holders, two

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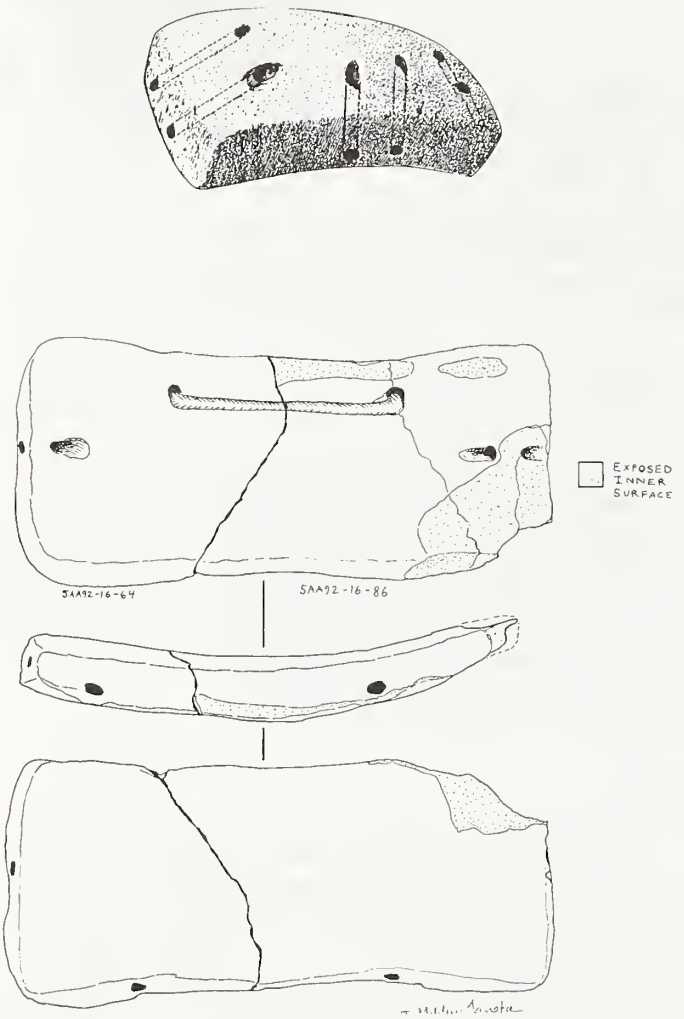

Figure 1. – Featherholder from Chimney Rock, 5AA92.

were found at Pueblo Bonito, two at Wallace Ruin, and two are of unknown provenance from the Pagosa-Piedra region, presently curated at Mesa Verde National Park. The objects are rectangular in shape with a meniscus cross-section. All the feather holders have holes in which feathers or prayer sticks could have been placed. Although objects with precisely the same style have not been found among the historical Pueblos, similar objects which functioned as feather holders on altars have been identified by Fewkes (1895, 1899).

Another unique aspect of the feather holders is that they comprise a class of brownware objects which appear to have been fired at temperatures not exceeding 500° C. The objects needed to hold together, yet they did not need to be vitrified as are other ceramics that are used to hold water. For our work, the important consequence of such low temperature firing is that original clays can be identified by X-Ray Diffraction as their crystalline structures remain largely intact.

What was actually placed in the holes of the feather holders is unknown. In the case of one feather holder, 5AA92-16-20, a hole is blocked with hematite, an iron ore that appears as metallic grey crystals. Inspection of the feather holders showed that traces of hematite could be seen in the holes of six additional objects. The hematite may have been used as a paint on the object that was placed within the holes. When that object was taken out, hematitic residue was left behind.

Judd's (1954) hypothesis that these feather holders had been employed in certain rituals was based upon the similarity of the artifacts to ritual objects found on historic Hopi altars. Although none of the Chimney Rock feather holders were found on an altar, most were found in a ritual context. Of the 11 feather holders found at Chimney Rock, 7 were recovered from possible clan houses which may have stored artifacts used in kiva ceremonies (Mobley-Tanaka 1989).

X-RAY DIFFRACTION STUDIES

The technique of X-Ray Diffraction is widely used for determining the mineralogy of clays (Williams 1987; Bertin 1970). We collected a total of 21 clay samples from Chimney Rock and 6 clay samples from Chaco Canyon. Of these, five samples from Chimney Rock and three from Chaco Canyon were studied by X-Ray Diffraction using two approaches. They were first prepared for whole rock diffraction analysis which establishes the mineralogy of the entire sample. Whole rock diffraction patterns will reveal not only the clays that are in a particular sample, but all of its constituents such as quartz, feldspars, and hornblende.

The second method of X-Ray Diffraction is to process a clay sample in order to identify the clays used to manufacture the artifact or those that are found in the soil by treating the clay samples with an ethylene glycol solution and then heating the material.

The molecular structure of each of the main clay types, kaolinite, smectite, and illite, dictates their ability to adsorb liquids between their lattices. Because kaolinite forms a tight molecular bond, it does not adsorb excess liquid, and therefore makes a good clay for ceramic manufacture.

Smectites, however, are able to adsorb liquids between their lattices causing a shift in the diffraction peak from 14 Angstroms to 17 Angstroms (fig. 2). Curve A shows the untreated clay pattern with a smectite peak at 14 Angstroms, a very small illite peak at 10 Angstroms and a kaolinite peak at 7 Angstroms. Curve B shows the glycolated clay sample with the 14 Angstroms smectite shifting to 17 Angstroms; note that the illite peak becomes a little better defined and the kaolinite peak is unaffected. Curve C shows the sample that has been heated to 550° C. When heated to 550° C the glycol that permeated the interstices of the smectites is driven off and the peak collapses to 10 Angstroms. When kaolinite is heated to 550° C the

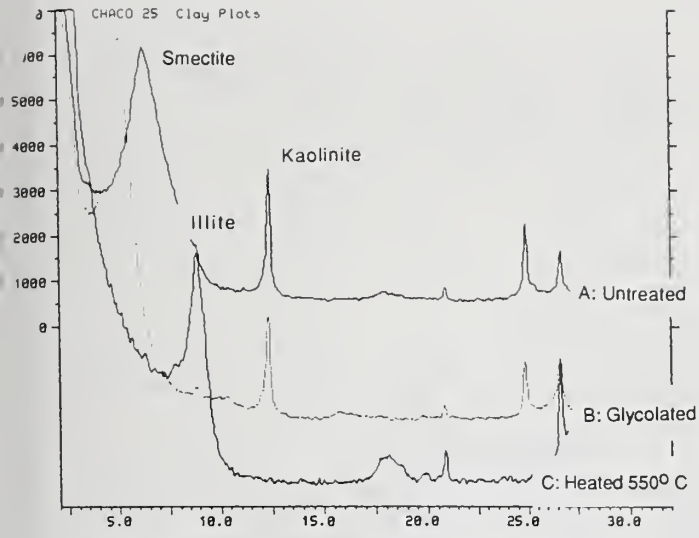

Figure 2. – X-Ray Diffraction of clay from Chaco Canyon showing the shift of the diffraction peak of a glycolated smectite.

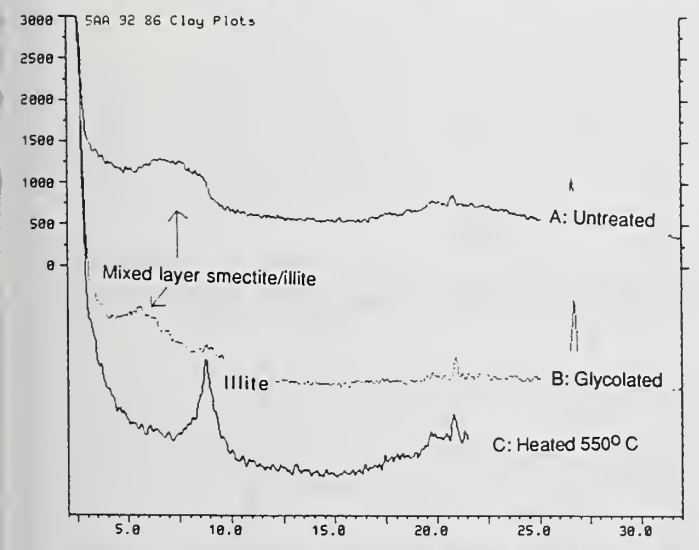

Figure 3. – X-Ray Diffraction plot of feather holder 5AA92-86 showing the clay components.

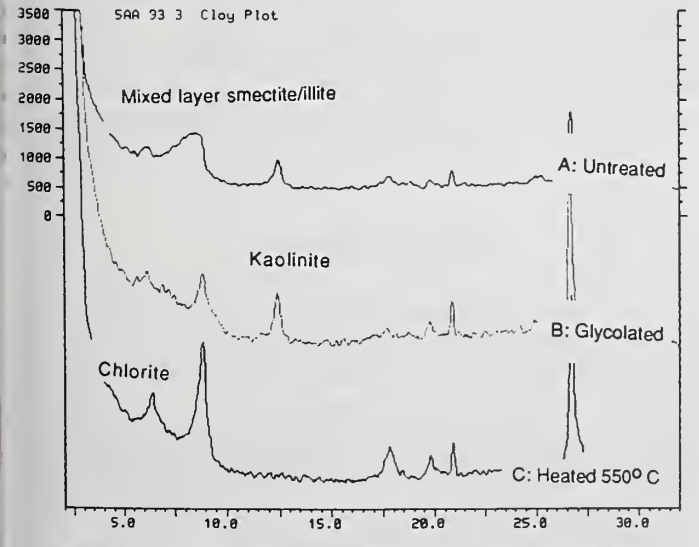

Figure 4. – X-Ray Diffraction plot showing the consituents in shale sample from 5AA93.

crystalline structure is destroyed and the peak disappears. Illite remains unchanged when it is heated but is indistinguishable from smectite.

All of the feather holders which were analyzed through X-Ray Diffraction exhibit a mixed layer of clays consisting of a smectite/illite component, as well as some traces of a kaolinite component (fig. 3). The Chimney Rock clay samples exhibit a kaolinite component and a mixed layer clay composed of an illite/smectite component, as well as a chlorite component (fig. 4). The Chaco Canyon clays exhibit kaolinitic, illitic/smectitic clays as well, but none displayed a chlorite component (fig. 2).

Figure 4, curve A, depicts the untreated clay sample from Chimney Rock showing a chlorite component at 14 Angstroms, a small amount of kaolinite at 7 Angstroms and a mixed smectite/illite at approximately 10 Angstroms. When the clay samples were heated, the mixed layer clay peak intensifies, and at 550° is quite distinguishable. This peak intensifies as the temperature increases, and finally disappears between 700° C and 750° C.

The presence of the chlorite component in the Chimney Rock clays and its absence in the feather holders came as a surprise. Chlorite is not a mineral which would have been removed utilizing standard manufacturing techniques for the feather holders, nor would it have been removed by weathering of the objects subsequent to manufacture. Therefore, we can assert with confidence that the feather holders we studied were not manufactured from any of the Chimney Rock clay sources tested in this study. Obviously, not all of the potential clay sources from within the CRAA were tested. Our negative results do not prove conclusively that the source of the feather holders was not the Chimney Rock Archaeological Area. The four clay samples we studied with X-Ray Diffraction were obtained exclusively from sites below the High Mesa, where all of the Chimney Rock feather holders were found. In retrospect, it is indeed reasonable to conclude that extensive ceramic manufacture did not occur on the mesas with their limited access to water. The feather holders must have been imported into the High Mesa settlements from elsewhere in the Chimney Rock area, the wider Piedra River region, or far beyond.

X-RAY FLUORESCENCE SPECTROSCOPY

X-Ray Fluorescence (XRF) is a non-destructive analytical technique that can establish the chemical composition of a sample by radiating a small portion of its surface with x rays. The elements are defined based on the measurement of the wavelengths and intensities of their x-ray spectral lines emitted by secondary excitation (Bertin 1970:67).

X-Ray Florescence spectroscopy was performed on 14 of the feather holders and 160 shards from the Chimney Rock area. Clay and adobe samples from Chimney Rock and clay samples from Chaco Canyon brought our total number of samples analyzed by XRF to 223. The ceramic samples were prepared

by rubbing one edge of the object with a silicon carbide cloth to expose fresh paste. The exposed edge was irradiated with monochromatic x rays from a ^{109}Cd source that has an energy of 22 kv (kilovolts) at the Los Alamos Scientific Laboratories. The largest number of secondary x rays that were detected came from the elements iron (Fe), strontium (Sr) and zirconium (Zr). The proportion of x rays from these three elements may be used as the x ray signature for the ceramic specimen.

The elemental percentages were processed by a cluster analysis program in the Statistical Package for the Social Sciences (SPSS) which identified 14 clusters. An analysis of the clusters using Student's T test indicated that two of the clusters (2 and 12) were not statistically separable.

The differences between the clusters may be attributed to differences in the chemical compositions of the clay source, in the chemical composition of the temper and/or in the mix of clay and temper. The majority of the plainwares have a crushed rock temper of either andesite and/or diorite. The whitewares appear to have two different tempers, either andesite or diorite, or predominantly clear quartz. Of the two largest whiteware clusters which were delineated through the cluster analysis, one is predominantly composed of ceramics with a clear quartz temper (fig. 5: cluster 7), while the other is composed of ceramics with predominantly a crushed rock temper (fig. 5: cluster 10). It may be that this difference in temper is due to a preference by the local potters. Alternately, ceramics associated with one or both of the clusters may have been imported into the area.

The one feather holder from Chaco Canyon we were able to analyze is a member of cluster 6. Table 1 lists the 14 clusters and their associated artifacts, but it does not include two feather holders from Wallace Ruin, which are both well-separated from the main group of feather holders.

The majority of the feather holders from Chimney Rock and Chaco Canyon (9/12) came from the 2 clusters, 1 and 6 (fig. 6), in which plainwares predominate. In the plainware group (A), plainwares constituted 69%, whitewares 20%, and feather holders 11%. Only 36% of the Chimney Rock clay samples were associated with this group, consistent with our X-Ray Diffraction results which indicated that the clays for the feather holders did not originate at the high mesas. In the whiteware group (B), whitewares constituted 86%, plainwares 8%, and Chimney Rock feather holders 6%.

On the basis of this data sample, it appears that the majority of the feather holders came from the same sources as the plainwares. Since the plainwares were probably not traded into the area from a great distance, we advance the hypothesis that the feather holders and plainwares were locally manufactured using a clay source from other than the High Mesa.

In addition to the information about the feather holders, the cluster analysis yields an interesting insight about ceramic manufacture in the Chimney Rock area. The 13 statistically separable clusters identified on the basis of their chemical composition did not form groups composed exclusively of the same ceramic styles. For example, three of the four plainware clusters contained whitewares. It thus appears that many of the 13 ceramic technologies of the Chimney Rock area used the same source of clay, the same temper, and a similar mix of clay and temper for plainwares, whitewares, and possibly feather holders as well.

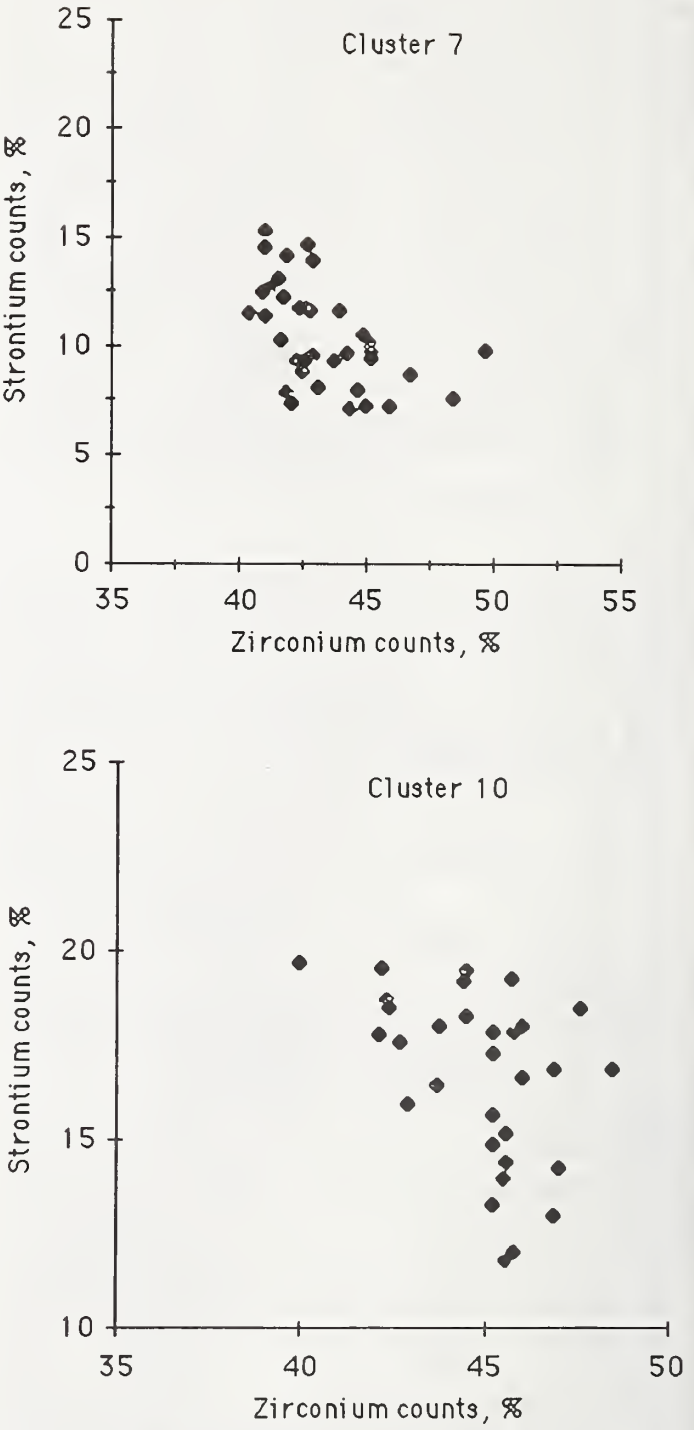

Figure 5.–Whiteware clusters 7 and 10.

Table 1. – The 14 clusters and their associated artifacts.

	FH	PW	WW	Total
A.		Predominantly Plainwares		
Cluster:				
1	4	38	8	50
2	-	5	-	5
3	-	8	1	9
10	5	7	5	16
Subtotal:	9	58	14	80
B.		Predominantly Whitewares		
Cluster:				
4	-	4	5	9
5	1	1	2	4
6	-	1	5	6
7	-	-	3	3
8	1	1	26	28
9	-	-	7	7
11	1	2	16	19
12	-	-	2	2
13	-	-	8	8
Subtotal:	3	9	74	86

FH = Feather Holder; PW = Plainware; WW = Whiteware.

If all the ceramics are of local manufacture, then the 13 clusters may identify 13 different clay sources and/or manufacturing techniques utilized to produce the ceramics of the CRAA. These ceramic clusters suggest a division of the CRAA into 13 separate ceramic technologies or schools. Some of these technologies may have been embedded within the same community. Because of the lack of water on the High Mesa, it seems unlikely that the population associated with 5AA83 was engaged in ceramic manufacture; hence these 13 ceramic traditions may have been dispersed among the 7 remaining communities. All 13 ceramic traditions need not have been contemporaneous, and we may be encountering evolutionary differences in technology and clay sources.

CONCLUSIONS

We started this study with two primary goals in mind. Through a systematic analysis of some of the ceramics and clays found at Chimney Rock and Chaco Canyon, we hoped to determine if precise locations for the manufacture of feather holders could be found, and if the feather holders could demonstrate a dynamic, two-way interaction between Chimney Rock and Chaco Canyon.

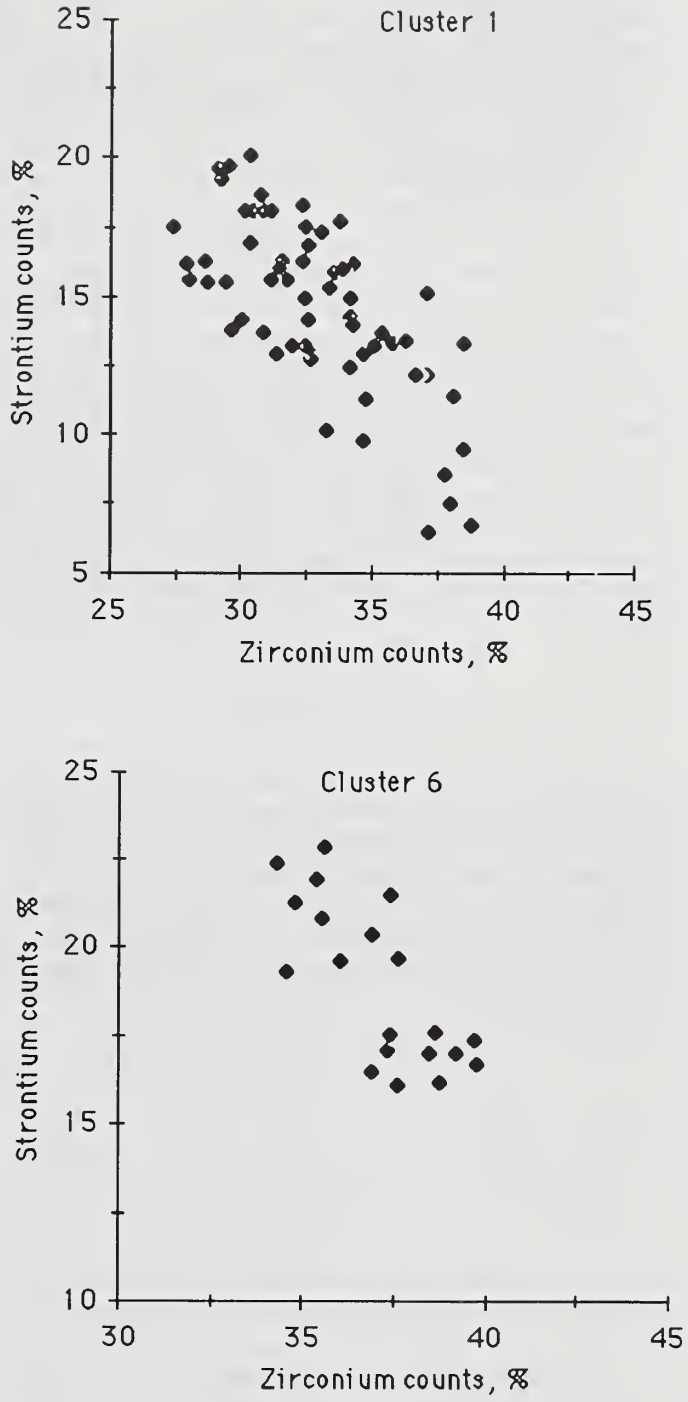

Figure 6. – Clusters 1 and 6.

Were the feather holders manufactured at Chimney Rock? The X-Ray Diffraction analysis indicates that they were not manufactured from clay similar to any of the samples collected from the High Mesa. The absence of chlorite from the Chaco Canyon clay samples could lead to the conclusion all feather

holders were manufactured in Chaco Canyon. However, the chemical similarity of the feather holders to plainwares at Chimney Rock could also argue for their origin at Chimney Rock. The presence of chlorite in all the clay samples collected at Chimney Rock means that the sources for the feather holders remain undetermined. The presence of the feather holder from Pueblo Bonito, in cluster 6, is consistent with its possible origin in the Chimney Rock area.

Where does this leave us in regard to the nature of the relationship between Chaco Canyon, Chimney Rock, and Wallace ruin? The feather holders represent unique ceremonial artifacts which so far have been found only at Chaco Canyon and two of its outliers. The chemical analysis suggests that all the feather holders from Chimney Rock, and the single object from Pueblo Bonito that we studied, originated in the Chimney Rock Area. In light of the abundance of the objects at CRAA and the ceremonial aspects of the Chimney Rock High Mesa, there may have been a particular ritual, perhaps involving the moon, which utilized the feather holders. A special ritual connection may also have existed between Wallace and Chimney Rock.

FUTURE WORK

To explore further some of the questions we have addressed, all of the feather holders could be subjected to a further trace element analysis utilizing different chemical elements, such as Instrument Neutron Activation Analysis (INAA), or Inductively Coupled Plasma (ICP) analysis. By providing a more precise and detailed analysis of the chemistry of the feather holders, it may be possible to establish the sources of these objects with less ambiguity.

Locating the clay source for the feather holders should have high priority. A thorough survey of possible sources of clay within the CRAA followed by X-Ray Diffraction studies may establish whether or not Chimney Rock was the origin of the feather holders. If chlorite turns out to be a ubiquitous component of clays in the area, then we must conclude that the feather holders were carried into the Chimney Rock area from elsewhere, perhaps Chaco Canyon, where there are clays without chlorite.

Based upon the chemistry of the ceramics, an important study of the technology of the ceramics within the Chimney Rock Archaeological Area is possible. Within seven of the communities of the CRAA, there may have been a number of independent ceramic sources. Exchange among the eight communities would have shuffled the ceramics, but an analysis of the geographic distribution of the XRF clusters may establish their sources.

ACKNOWLEDGMENTS

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Resource Distribution and the Chaco Phenomenon

W. James Judge[1]

Abstract — The results of excavation of Pueblo Alto by the Chaco Project tend to refute the resource redistribution model for the Chacoan culture area and support that of ceremonial consumption involving ritual visits or pilgrimages to Chaco Canyon. Local redistribution in areas of marginal human occupation may have occurred between peripheral communities and may have led to roads connecting the outliers. Knowledge of the ritual calendar may have given individuals in Chaco Canyon control over the extended Chacoan system. The Chimney Rock community may have elected to participate in the Chacoan system because of the ritual importance of the double pinnacles and/or the economic importance of timber.

The argument that the massive architectural developments in Chaco Canyon were associated with a broadly based redistributive network was conceived by a number of us working for the Chaco project while developing the research design for the excavation of Pueblo Alto. In the mid-1970's, we knew about the road network, and we were beginning to appreciate the magnitude of the Chacoan system. The redistribution hypothesis was based upon the argument that Chaco Canyon was deficient in a number of key resources, an assumption with which few should disagree. We argued that, because of its own resource deficiency, Chaco was dependent, at least in part, on the resource-rich areas at the periphery of the San Juan Basin to sustain its economy.

Because rainfall comes in a very patchy and unpredictable fashion in the San Juan Basin, we suggested that the Chacoan systemic response was to disperse its farming resources throughout the Basin in order to maximize the collective potential yield. Higher yield harvests would then be transported into central Chaco via the road system, where they would be stored in the great houses and then redistributed to lower yield areas using the same road systems. As a result of such smoothing of the fluctuations of the production system, the San Juan Basin was able to support a larger population than it could have in the absence of such redistribution network. When we began the excavation of Pueblo Alto we were surprised to uncover evidence which refuted the redistribution model. Instead of Pueblo Alto serving as a redistribution point, it seems to have served as a collection point for various goods, some of which were consumed at the site and others (ceramics, lithics) purposely destroyed there and deposited in the trash midden. At the Pueblo Alto trash mound, we found evidence of the breaking of some 50 pots per person per year. The overwhelming evidence at Pueblo Alto was for ceremonial **consumption** of goods, not their redistribution. This evidence led us to develop an alternate hypothesis, informally termed the "Chaco Hilton" model, which envisioned ritual visits or pilgrimages from the outliers to Chaco Canyon via the road systems. While ceremonies were being conducted, the great houses were occupied by pilgrims and their families. Although the exact nature of these rituals is not known (and may never be), the archaeological evidence from Pueblo Alto suggests periodic gatherings involving feasting and ritual destruction of material goods manufactured elsewhere and carried into Chaco Canyon. (At one point we considered renaming this the "Black Hole Hypothesis, "since apparently most of the material goods were going into Chaco and few, if any, were coming back out.)

I think it is interesting and important to look into how such a system (i.e., the central Canyon, the road network, and the outliers) may have evolved. Did the outlier system develop contemporaneously with the central canyon, or were Chacoan structures "plunked down" in the midst of existing communities? Personally, I like the term used by Lynne Sebastian when she refers to outlying areas being "captured" by Chaco Canyon. This term does not imply the forcible enslavement of an outlying area by all-powerful Chacoans, as much as being interested in and

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impressed by their ideas and consequently captured in the ideological sense. Once "captured," the outlying community would begin to conform to the architectural and ideological components of the Chacoan system. Capturing of outliers probably did not occur all at once. In fact, there seems to be a general temporal trend of incorporation from south to north through time.

Returning to the issue of redistribution, we must remember the evolution of the Chacoan system took place in an area which has an average, annual precipitation of less than 10 inches; much of the area is marginal for successful human occupation. Given this fact, my feeling is that the San Juan Basin could not have supported a significant population in the absence of some form of redistribution since it can't be done today, I doubt that it could have been done in Chaco times, or any time since the advent of sedentism.

Perhaps in developing our original hypothesis we were wrong in thinking that all redistribution had to be channeled through the center of the system. Redistribution may have occurred between the peripheral communities in varying degrees of formality and magnitude, from Basketmaker times through the peak of the Chacoan system and beyond. There is no reason to believe that community-sustaining redistribution had to cease simply because its formal ideological component stopped or that it had not existed before that time. Given the carrying capacity of the San Juan Basin and the known site frequencies from the 6th century onward, some form of redistribution would almost certainly have been in effect prior to the Classic Bonito Phase in Chaco. The difference is that it was apparently highly formalized in ritual during the Chacoan peak, A.D. 1050 to 1150. This formality ceased and the system reorganized after A.D. 1150, due primarily to the lengthy period of severely reduced precipitation in the latter part of the 12th century. In all probability, after central Chaco collapsed, redistribution continued, not in the overt form of rituals such at Pueblo Alto, but among the surviving outliers, particularly those in the northern sector of the system.

In my view, redistribution among outliers is why we find prehistoric roads in various places in the peripheral areas which do not seem to go to Chaco Canyon. John Roney (see the "Bonito Style Community Structures: Chimney Rock Pueblo in Regional Context" chapter) has pointed out that there are roads on Chacra Mesa and elsewhere which apparently have nothing to do with Chaco: all roads do not necessarily lead to Chaco. It seems appropriate to examine roads in the peripheral areas from the standpoint of their serving redistributive needs among and between the outliers themselves, irrespective of their relationship to the central canyon.

In one respect, the outliers had "invested" in Chaco Canyon, which in turn became dependent on them. Given the environmental deterioration of the 12th century, the outliers gave up their investment in the central canyon and maintained the economic component of the redistributive system wherever they could.

In my view, Chimney Rock is a community which elected to participate in the Chacoan system on its own merits. The motivation for joining may have been the ritual importance of the double pinnacles with their dramatic performance at lunar standstills or the economic importance of timber producing lands, or both for that matter. For whatever reason, it was "captured" by the Chacoan system; it became economically and ritually important for them to subscribe to the Chacoan ideological concept. They built their own Chacoan structures to mimic the architectural style of the central canyon and to participate actively in its rituals. Whether the Chimney Rock community functioned primarily as a lunar standstill site or as a resource area for Chaco is a very interesting question that hopefully will be pursued.

Another important issue is how the ceremonial calendar was established, regulated, and communicated to the Chacoan communities so widely dispersed throughout the San Juan Basin. It would seem logical that the calendar was controlled from the central Canyon by a group of individuals who had the power and responsibility to both set the dates of various rituals and to communicate those dates so that the entire system would be observing the same rituals at the same time. To effect such timing would have required a communication system above and beyond the road network, perhaps something like the visual, line-of-sight system suggested by Tom Windes some time ago. If Chimney Rock did participate actively (as opposed to passively) in the lunar component of the Chacoan calendar, then we would expect a visual communication system to have existed between the two places.

The information on timing of lunar standstill, that is the 18.6 year cycle, is knowledge which could well have been shared by only a few individuals in Chaco, and thus could have kept them in power and control of the system for some time. Perhaps it was this kind of control which allowed the central canyon to maintain its position of ritual and architectural authority during the development and peak of the Chacoan system and to command the labor and energy investment it did through most of the 11th and 12th centuries.

Intracommunity Interactions at Chimney Rock: The Inside View of the Outlier Problem

Jeannette L. Mobley-Tanaka[1]

Abstract — Ceramic and architectural evidence does not uphold a model involving ethnic differences within the Chimney Rock area. The Chimney Rock Pueblo and other apparent Chaco associated phenomena at Chimney Rock may have been entirely indigenous developments and not the result of a dominant Chaco elite which built and operated the facility. The architecture of the High Mesa may not be indicative of a direct link to Chaco Canyon but may reveal a specific type of community structure that existed widely during Pueblo II times.

A major assumption of dominant Chacoan outlier models is the exploitation of resources and people by Chacoan intruders in areas occupied by non-Chacoans. This idea has been developed in order to help answer long-standing questions about Chaco Canyon: how was such a large and complex culture sustained in such a resource-scarce environment, and what is the relationship between Bonito Phase architecture and other types of architecture? While exploitation models make sense from a Chacoan perspective, do they work when tested as an outlier? This paper is a test of such models at the prehistoric community of Chimney Rock. Through an examination of artifacts and architecture from "Chacoan" and "non-Chacoan" areas at Chimney Rock, the ideas of ethnic differences and exploitative relationships are examined. If interactions inside a community such as Chimney Rock can be identified, it could reflect upon the interactions between Chimney Rock and the Chacoan core.

THE RELATIONSHIP BETWEEN CHACO AND CHACOAN OUTLIERS

Two major models of Chacoan core/outlier interaction can be found in the literature. The first of these sees the outliers as an expansion out of Chaco Canyon into surrounding resource-rich areas. Resources were brought back to Chaco Canyon and the environmental risks were minimized. Thus Chaco Canyon serves as the economic hub of a vast integrated region. Whether this expansion was accomplished through egalitarian (Vivian 1989) or stratified (Lekson et al. 1988) means is a point of some contention. In either case, the relationship between outliers and their local environments is defined as one of exploitation for the benefit of the Chacoan core. In cases where Chacoan outliers are situated within communities of non-Chacoan style, the exploitation of local resources is usually applied to the inhabitants of the region as well. That is, the local non-Chacoans become an exploitable labor force for the Chacoans. This is generally believed to occur through peaceful means, as the indigenous people trade their economic production for the religious and political benefits of the Chacoans (Kane 1986; Reed 1979; Eddy 1977).

In the second major model, Chaco is a ceremonial center, with only a small resident caretaker population. The majority of Chacoan people are those inhabiting the surrounding basin, who go to Chaco only on ceremonial occasions. On these occasions, people bring their material goods, which are redistributed through the ritual system rather than through trade (Toll 1986; Judge et al. 1981). This model does not attempt to explain the relationship between Chacoan-style outliers in non-Chacoan-style communities. However, a key element of this model is the control of local resources by Chacoans, allowing

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for redistribution with other Chacoans on ceremonial occasions. Presumably, non-Chacoans are not interfering with this system by competing for control of resources.

A major weakness of both of these models has been the lack of testing from the perspective of the outliers. While it is clear that the outliers are vital to the survival of Chaco in these models, the evidence to support the models has not been sought at the outliers, but at the core.

Because it was an area with a large population and a good deal of architectural variety, the Chimney Rock Archaeological Area (CRAA) is a good place to test the outlier model. Within the CRAA, three distinctly different architectural styles were occupied simultaneously during the Pueblo II period, reflecting both Chacoan and Mesa Verde styles of architecture. This suggests a mixed Chacoan and non-Chacoan community.

Architectural styles at Chimney Rock vary according to elevation (fig. 1), with the bulk of the population on the Pleistocene terraces of the Piedra River and on the top of the Chimney Rock Mesa, overlooking the Piedra and Stollsteimer Valleys. Pit houses and associated cobble and jacal rooms make up the bulk of the house types along the river terraces. Interspersed with these are occasional dome shaped cobble mounds, thought to be the remains of cobble masonry houses and towers.

The lower part of the Chimney Rock Mesa has a different type of structure from those seen on the terraces below, though similar to the cobble masonry structures. Here the dominant architectural type consists of circular masonry structures with small, roughly rectangular rooms attached to the north. No pit houses or other subterranean structures have as yet been identified on the mesa top.

On the upper part of the mesa is yet another architectural form, distinct from those of the river terraces or the Lower Mesa, only a few hundred feet away. This structure, the Chimney Rock Pueblo, is a multi-story pueblo of about 40 ground floor rooms and two kivas.

Although the different architectural styles are grouped in different areas at Chimney Rock, survey and excavation data indicate that all three areas were occupied concurrently during the Pueblo II stage (Eddy 1977; Mobley-Tanaka 1990). Given their proximity to one another, and their relative isolation from other Anasazi communities, it is clear that the residents of these areas interacted with one another on a regular basis. Riverside and mesa top groups must have functioned as one large community.

Because contact between the inhabitants of the different groups was inevitable and must have occurred on a constant basis, we must examine all three groups and the nature of the interactions between them if we are to understand any part of the Chimney Rock occupation. Furthermore, the interaction among the different sectors of the Chimney Rock community can be used to test the models of outlier-Chacoan interaction. If the Chimney Rock Pueblo is a Chacoan colony, founded to exploit natural and human resources in the Piedra River drainage, then ethnic differences between the different groups and differential access to wealth or resources should be evident.

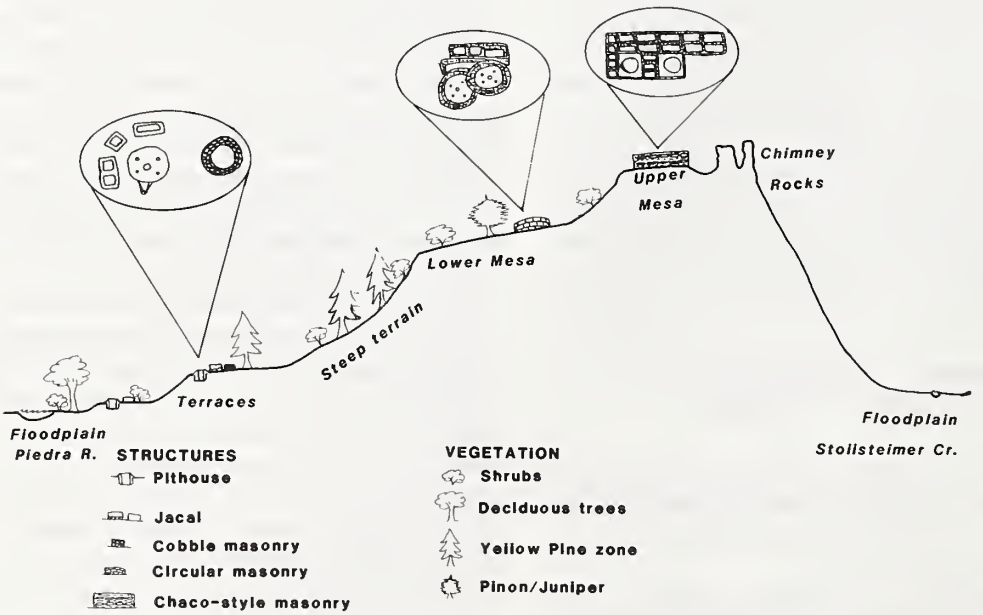

Figure 1. – Environmental zones at Chimney Rock.

ETHNICITY IN THE ARCHAEOLOGICAL RECORD

Ethnic affiliation is difficult to detect from the archaeological record; however, it is generally recognized that when different ethnic groups live very closely to one another, boundaries are drawn along ethnic lines (McGuire 1982). The boundaries maintained in multiethnic communities are potentially recognizable in the archaeological record in two ways. First, the creation and maintenance of boundaries is often achieved through the manipulation of symbols and style, thus distinctly different styles can signal ethnic boundaries (Hegmon 1989). Second, different ethnic groups will have somewhat different cultural traditions which will be reflected in their material culture and in remains of their patterned behavior (i.e., use of space, site organization, etc.) which are left behind. McGuire (1982) suggests that the latter is more likely to be preserved and recognized in an archaeological site, but symbols that may have defined ethnic boundaries have been used by archaeologists as well (Renfrew 1986; Hegmon 1989). In historic ethnic groups, three classes of material culture have been found to be consistent markers of ethnic differences: architecture, ceramics, and food remains (McGuire 1982). Food remains are probably not a good indicator in the Southwest, because of the pan-Southwestern diet of corn, beans, and squash which was and still is shared by a number of distinct ethnic groups. However, the other two classes, architecture and ceramics, can be used to explore the hypothesis that ethnic differences may exist at Chimney Rock.

CERAMIC DESIGN

Design styles, such as those exhibited on ceramics, are an element which frequently varies enough to define ethnic boundaries (Hegmon 1989). This is certainly true for the Mesa Verde area and the Chacoan area overall, where distinctly different ceramic series can be found. If Upper Mesa inhabitants are Chacoan, then we should expect to see Cibolan ceramics as the predominant type on the Upper Mesa. These should be in contrast with local Mesa Verdean ceramics from the Lower Mesa and riverside sites. However, this is not the case at Chimney Rock. Chacoan imports occur in very low but similar frequencies at all sites on the mesa top. Mancos Black-on-white, a locally manufactured type in the Mesa Verde series was by far the most frequently occurring ceramic type in both survey and excavation collections. On the riverside sites even fewer Chacoan ceramics were found, and the dominant types were again local.

However, within the Mancos Black-on-white decoration, there are some interesting differences which may indicate boundaries. Stylistic designs on Mancos Black-on-white throughout the Mesa Verde area show a good deal of variety, but are predominantly made up of solid black triangle and thick band motives. Hatched bands also occur, but are generally in the minority, occurring on less than 40% of vessels (Breternitz, Rohn and Morris 1974). At Chimney Rock, an examination of stylistic attributes presents a somewhat different picture (Table 1). On the Lower Mesa and riverside sites hatched band elements occur well within the expected range for Mancos

Table 1. — Comparison of hatched band elements on Upper Mesa and Lower Mesa pottery.

Site 5AA-	Hatched Bands		Pendant Triangles		Interlocking Triangles		Thick Bands		Interlocking Bands		Checker-Board		Thin Lines		Other	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
83 N=52	29	55.8	5	9.6	3	5.8	10	19.2	2	3.8	2	3.8	0	0	1	1.9
86 N=51	13	25.4	12	23.5	2	3.9	17	33.3	2	3.9	1	1.9	1	1.9	3	5.9
88 N=5	1	20	0	0	0	0	2	40	0	0	0	0	2	40	0	0
92 N=22	5	22.7	0	0	0	0	12	54.5	1	4.5	1	4.5	2	9.1	1	4.5
Breternitz Rohn, & Morris (1974)	<40															

Sample size is too small for meaningful percentages.
Control sample based on Mancos B/W pottery for the Mesa Verde region.

Black-on-white. However, on the Upper Mesa hatched bands are the dominant motif, occurring on 55.8% of the pottery. This difference is interesting because hatched bands are the main stylistic element of the Chacoan area in this period. There may have been a conscious attempt by potters at the Upper Mesa site to imitate Chacoan designs on local vessels. Smith (1987) notes a similar tendency in households which maintain wide spheres of interaction. These households often contain artifacts which exhibit decoration that is part of a geographically extensive stylistic network. Therefore, based on ceramic design styles, we might argue that the residents of the Upper Mesa were not Chacoan themselves, but were more strongly influenced by Chacoan styles than were other members of the Chimney Rock community.

ARCHITECTURE

Architecture has been the primary means by which Chacoan outliers have been defined and determined to be built and occupied by populations from Chaco Canyon. This argument is based on the differences between Chacoan masonry styles and Mesa Verde styles, and on the assumption that the two are mutually exclusive patterns, and not variations along a continuum. Irwin Williams (1980) argued at Salmon Ruin in northern New Mexico that the construction of such Chacoan Outliers required considerable technical knowledge about Chacoan masonry, and that specialization, centralized authority, and tight social control were all aspects of the construction of a Chacoan Outlier which indicate that it was in fact built by Chacoans. This argument is based on the assumption that only in Chaco was such organization achieved, and it ignores the presence of large-scale building projects elsewhere in the Southwest which are not Chacoan, but would have likewise required considerable manpower and organization. At Chimney Rock the architectural styles of the Upper Mesa and the Lower Mesa or the riverside are clearly distinct, and have likewise been used to argue that the occupants of the Upper Mesa and the Lower Mesa were ethnically different (Eddy 1977).

Unfortunately, at many Chacoan Outliers the architectural differences have been taken as solid evidence that they are truly Chacoan, and the hypothesis has not been tested further. In fact, it is often a circular argument, in which a structure is suspected of being an outlier based on its layout and masonry style, and so the hypothesis is brought forward that this reflects Chacoan inhabitants. This hypothesis is then tested and validated by reasoning that the architectural design is so different from nearby structures that it is a site-unit intrusion which indicates Chacoan occupation. This argument has even been used at sites which are later than the Chacoan Phenomenon as a whole (Reed et al. 1979). Because of the possibility of different functions associated with different architectural style, I would argue that architectural style alone is not enough to determine the existence of Chacoans at Chacoan Outliers. If it were, then we might argue that the Mesa Verde cliff dwellings represent a different group from the Prudden-unit dwellings of the Montezuma Valley, or that Chartres Cathedral represents an ethnic enclave distinct from the surrounding medieval French village.

I do not mean to argue that architecture is useless in determining ethnic distinctions; however, more aspects of architecture than just construction style and other lines of evidence must be used to determine ethnic differences. Because architecture organizes space and controls the movement of people, it reflects the traditional organization of a group (Fritz 1978, Saile 1977). Thus, different traditions of social organization will be preserved to some degree in houses, and also traditional patterns of use of space will be detectable in the relationship of placement of items and the room which confines them.

Unfortunately, architectural patterns are defined by factors other than social organization, and determining which features of architecture represent social structure is difficult. Differences in the organization and use of space do occur at Chimney Rock, indicating real differences between the Upper Mesa, Lower Mesa and Riverside; however, not all of these differences necessarily indicate ethnic differences.

It is immediately evident, when the three different construction styles are viewed, that space is organized differently in the three areas The Upper Mesa Pueblo is a large compact unit with a number of rooms, where a number of families may have lived. The Lower Mesa structures are much smaller, each a single family unit, and separated from one another by some space. The pithouse villages of the riverside are likewise separate from one another, each pithouse and room block group discrete from others. In addition, on the Upper Mesa rooms are connected by doorways, while on the Lower Mesa no doorways connect rooms, even where rooms are contiguous. On the riverside, many rooms are in isolation from other rooms, but where contiguous rooms are found they are not connected by doorways, with the exception of one pair of houses excavated by Roberts on Stollsteimer Mesa, which were separate structures but were connected by a short passageway (Roberts 1930).

While these are clearly differences in the organization of space as defined by architecture, they do not seem to reflect ethnic differences. However, they may reflect interesting differences in the relationship between habitation and storage. Gilman (1987) has suggested that the move from separate storage structures to storage in rooms contiguous to residential rooms implies an attempt to better control stored goods. If this is the case, then the people of the Upper Mesa Pueblo, with its compact and interconnected rooms, were exerting relatively tight control over their stored resources, while the riverside inhabitants, with storage structures completely separate from habitations, were much less concerned with isolating resources from their neighbors. The Lower Mesa houses, with attached storage rooms but no interconnecting doorways, were intermediate between the two styles.

The use of space within living rooms, and the differentiation of space within a room, may reflect different social patterns. Patterns of use of space are similar in the Upper Mesa and

Lower Mesa living rooms although differences in types of activities within rooms are evident. Almost all of these rooms show a concentration of portable artifacts in the southern half of the room, and especially in the southeast. Although the excavation data from riverside sites is limited, there is some evidence of a similar pattern at Sites 5AA245 and 5AA248 (Mobley-Tanaka 1990). This is especially true in Room 1 at 5AA248, where a reconstructible vessel and a large amount of chert were found clustered together in the southern part of the room, mainly in the southwest. The consistency of these patterns would suggest that cultural norms of use of space within rooms was quite similar in all areas, despite the difference in shape or construction of the room. Thus, the built environment is not dictating room use and therefore consistent patterns might be the result of social factors, such as ethnic similarity.

While the use of space was similar, the number of activities occurring in living rooms of the Upper Mesa were more restricted than in the other two areas, suggesting that Upper Mesa households had multiple living rooms, while Lower Mesa residents had one living room per household (Table 2). In all the Lower Mesa living rooms a variety of activities were represented by floor contact debris. These included lithic production, the processing (milling), preparation and consumption of food, basket weaving, and the storage of a number of artifacts used outside of the room by the inhabitants, such as projectile points and axes.

In the Upper Mesa living room, only food preparation and consumption were clearly evident, with a few lithic flakes and two bone awls suggesting other activities in the room. Roberts (1930) recorded a full range of objects in the surface rooms of Stollsteimer Mesa, though it is not clear what was found in fill and what represents floor contact assemblages. Riverside rooms excavated in 1989 were mainly clean of artifacts, although lithic, bone, and ceramic artifacts were found beneath the roof fall in both structures (Mobley-Tanaka 1990).

From these lines of evidence, the overall patterning of use of space at Chimney Rock seems to crosscut the different architectural types, although it would appear that the Upper Mesa households occupied more space, and thus spread activities out into multiple rooms. However, even though activities are being spread out, use of space within rooms remains similar to that of the Lower Mesa and riverside, and is probably related. Although structures are stylistically quite different, the social units which inhabited them do not seem to have been very different, and probably did not reflect different ethnic groups.

DISCUSSION

While the ceramic and architectural evidence does not suggest ethnic differences, it does show differences, in the use of style and the organization of space. If these differences do not represent a Chacoan enclave in the midst of a Mesa Verdean community, what do they represent and what does it tell us about Chacoan Outliers in general? Based on the evidence from Chimney Rock, I would like to suggest the great house style structure is part of an indigenous community, and that such structures throughout the Mesa Verde area do not represent an intrusion of Chacoans, but rather an Anasazi tradition which cross-cuts the Mesa Verde and Chaco areas. While the great house reaches its stylistic zenith in Chaco Canyon, its presence elsewhere, particularly in the Mesa Verde region, is not necessarily an outgrowth of a Chacoan Phenomenon. This idea has been suggested elsewhere by Wheat (1983).

Table 2. – Comparison of living areas in Upper Mesa and Lower Mesa households.

	Painted Ceramics	Corrugated Ceramics	Plain Ceramics	Lithic Tools/Util. Flakes	Lithic Debitage	Ground Stone	Non-Flaked Lithics	Bone Tools	Ritual Items	Other
5AA83	(186)	(395)	(11)	(3)	(11)	(0)	(0)	(2)	(1)	(2) Baskets
5AA86	81	265	176	21	187	25	15	10	0	(1) Small clay
	(81)	(259)	(175)	(21)	(187)	(18)	(12)	(10)		sphere
5AA88	25	297	155	1	26	22	14	6	5	
	(20)	(125)	(57)	(1)	(26)	(14)	(13)	(4)	(5)	
5AA92	28	427	330	4	50	19	17	6	9	(1) Petroglyph
	(7)	(275)	(268)	(1)	(20)	(10)	(5)	(5)	(8)	slab
5AA245	0	3	2		2	1	0	0	0	
5AA248	1	111	7		24	1	0	0	0	

Note: Numbers in parenthesis represent totals from livingrooms only.

If the presence of a great house in the midst of a Mesa Verde community does not suggest a Chacoan presence, an explanation for the existence of such structures is still needed. The differences observed at Chimney Rock which do not reflect ethnicity may be helpful clues. These differences are:

1. Ceramic styles on the Upper Mesa are different from those on the Lower Mesa and riverside and may reflect a wider sphere of interaction for the households of the Upper Mesa. In addition, there are more painted ceramics on the Upper Mesa.
2. Differences in room configuration indicate more control of stored goods on the Upper Mesa. There is also more storage space per living room on the Upper Mesa than on the Lower Mesa or the riverside.

Based on these lines of evidence, I would like to suggest that the Chimney Rock Pueblo may have served as a community economic center which played an integrative role within the community, as well as being a link to other communities. The great house may be a communal building for trade of goods and for community wide ritual. Increased storage space could be for the collection of goods to be traded out of the area or redistributed within it. The households that actually inhabited the structure may have had some control over this distribution system, and thus maintained a wide sphere of interaction, and perhaps even slightly higher status than their neighbors, reflected in the painted ceramics.

Other lines of evidence further suggest that Chimney Rock Pueblo had a community role. For example, the only kivas as yet found at Chimney Rock are those in the Upper Mesa Pueblo. Ritual items were found in all parts of the Chimney Rock area, indicating that ritual is not confined to the Upper Mesa. The kivas may be the site of larger, community wide ritual, and such rituals may be the occasion of redistribution of material goods. In addition, Room 11, excavated by Jeancon and Roberts in 1921, contained 29 metates, but no manos. One plausible explanation may be that the metates were stored for community gatherings which required the preparation of large amounts of food. Thus, we might envision the Chimney Rock Pueblo as the site of large gatherings at which rituals and trade were conducted.

Similar hypotheses have been developed based on the material evidence for some of the great houses of Chaco Canyon, such as Pueblo Bonito and Pueblo Alto (Lekson et al. 1988). However, I would suggest that the similarity in use indicates not that Chimney Rock is an outlying center of Chaco Canyon, but that the great house, wherever it is found, is functionally specific. The architectural style is not symbolic of a link to Chaco, but symbolic of a specific type of community structure which was in use throughout both the Mesa Verde and Chaco areas in Pueblo II times.

CONCLUSION

Chacoan Outliers have been defined and studied mostly from the perspective of the Chacoan core. This study of the Chimney Rock community illustrates that it is important to examine such structures from the perspective of the local community of which they are a part. The evidence from intracommunity examinations does not substantiate dominant outlier models and suggests that new models are needed to explain the existence of such structures, especially as they occur outside of the Chaco area.

The model of a specialized community structure presented in this paper is admittedly somewhat speculative and needs further testing at other "outlier" communities in order to be more fully refined or substantiated. However, the lack of evidence linking great-house-style structures to the Chacoan core calls for continued research focusing on the structures themselves and their relationships within their local environments.

Settlement Analogues for Chimney Rock: Models of 11th & 12th Century Northern Anasazi Society

Allen E. Kane[1]

Abstract — Chimney Rock may have been a resource gathering and processing center for Chaco Canyon, specifically for wood beams for construction at Chaco. The timber camp hypothesis and the more general redistributive exchange model are developed extensively with the intent of stimulating discussion and further field research.

Since the beginning of archaeological investigation in the Four Corners, researchers and the general public have been fascinated by the large Anasazi settlements discovered in the area. Distributed across several counties, but concentrated in the Great Sage Plain west of Cortez and within Mesa Verde National Park, these ruins of former Anasazi towns are a great laboratory of archaeological information and a priceless heritage resource. From the grand synthesizers of prehistoric cultures to the ambitious graduate student and the avocational excavator, these massive piles of broken rubble are the closest one can get in this country to discovering ancient mysteries and civilizations in the style of Indiana Jones. A stimulating topic of debate among those with primary research interests in this facet of Southwestern archaeology is the relationship of these population centers to the remainder of Anasazidom and specifically, the relationship of this area to the Chaco Culture of northwestern New Mexico.

Scholars such as Wheat (1983; Lange et al. 1986) champion an "independent ceremonial center" model, i.e., the logical consequence of a locally generated need for more elaborate ritual and ceremony. I assume that these scholars would agree with the statement that, in a political sense, these centers were characterized by local and regional autonomy. Inter-center relationships were structured by this basic independence; there may have been impermanent and fragile alliances and intensive trade relationships, but the major centers had no long lasting local political ties, nor were they part of a larger regional system with far-ranging political, economic, and exchange linkages.

One of the basic tenets of the "independent ceremonial center" hypothesis is that the architectural variability evident in the archaeological record is the result of the independent origin and growth of individual centers. Indeed, if one examines the record, there is considerable variability in the architectural expression of these large 11th and 12th century sites. However, it is my belief this variability can be explained by application of an alternative explanatory model: first, that the architecture of the period in question (late Pueblo II and early Pueblo III according to the Pecos classification) in the Four Corners is more structured than the supporters of the independent center hypothesis admit, and second, that this PIIPIII architectural manifestation can better be explained by pan-regional political and economic forces rather than independent ceremonialism. Much of the relevant architectural patterning can be explained as the expected result of the northern expansion of the "Chacoan System," (fig. 1) or as the radicals phrase it, the pan-Southwest Anasazi state, and the interaction of this system with the already existing local settlements.

THE HISTORY OF THE CHACO CONCEPT

Architectural affinities between the prehistoric towns within Chaco Canyon itself and contemporaneous village sites as far removed as 130 km have been recognized by archaeologists for over half a century (Jeancon and Roberts 1924; Morris 1928;

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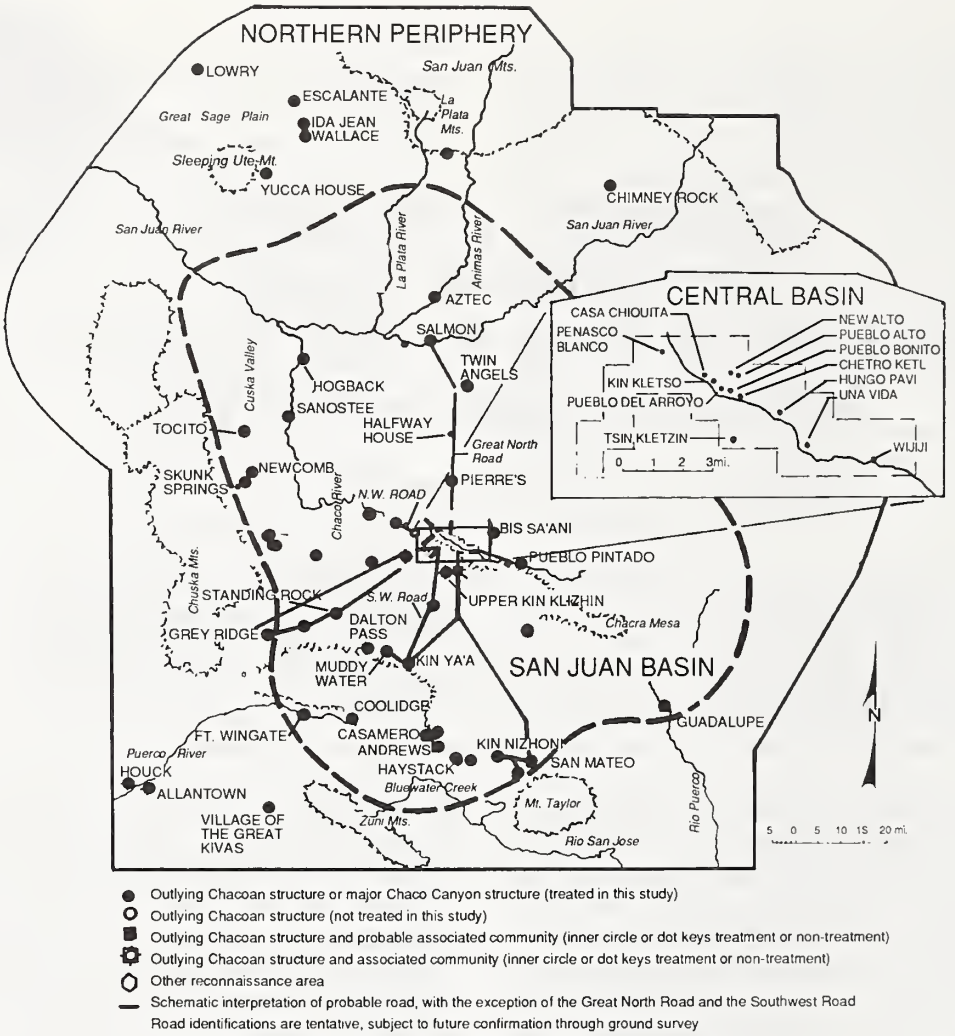

Figure 1. – Location of the Anasazi regional system (or the northern portion of the pan-Southwest Anasazi state); proposed system-allied communities with great houses and inter-system roads are shown. Map adapted from Powers et al. (1983:figure1).

Martin 1936). Early explanations advanced for these similarities included migration to and colonization of "fringe" or peripheral areas by Chacoan groups (Martin 1936; Morris 1939), or diffusion of Chacoan culture traits (Roberts 1932). These early theories went out of favor as more knowledge was gained regarding the scope of the Chaco phenomenon, and as diffusion was abandoned as a satisfactory explanatory device in anthropological theory (Powers et al. 1983). Interest in the Chaco Outlier problem was rekindled in the 1970's, and advances in perception were quick to follow. Vivian (1970) was perhaps the first to recognize the important role of outlier communities in a regionally scaled complex socioeconomic system. Frisbie (1972) revived the colonization hypothesis and emphasized the importance of internal trade networks in a "Chaco interaction sphere." Eddy (1977) suggested that colonization may have been limited to a few elite specialists who became religious leaders for local populations.

More recently, new suggestions in this area have been advanced by the staff of the National Park Service's Chaco Center (Judge 1979, 1984; Powers et al. 1983, Judge and Schelburg 1984). In essence, this group viewed the regional scale cultural system as a buffering mechanism which shielded participating communities from local environmental fluctuations affecting resource supply. Given the inherent environmental homogeneity of Chaco Canyon and other central basin areas, and the relatively poor quality of the basin in terms of biomass productivity, early Chacoan communities may have sought to mitigate the effects of unpredictable supply and increasing demand through migration and intensified exchange (Toll 1978; Judge 1979; Schelburg 1979; Powers 1984). Central Basin communities may have pursued redistributive exchange as the most viable buffering mechanism; a sophisticated exchange

network controlled in its major aspects by the Central Basin would have provided adequate insurance against periodic subsistence resource shortfalls.

What the basin communities may have provided the outliers in return is still unclear. The Chaco Center staff suggests that the basin communities may have controlled the distributions of certain commodities (turquoise, salt, obsidian, shell, etc.) not available within the territorial range of basin and outlier communities (Powers 1984). Or, given their architectural expertise, the basin communities may have provided their peripheral symbionts with specialists who constructed Chacoan-style residential structures and great kivas for the local populations (Powers et al. 1983). The end result of these relationships may have been the emergence of Chaco Canyon itself as a regional power broker and as a market center for internal system produce (Toll 1978), as well as the accumulation of local power and status by the immigrant architectural specialists at the peripheral outliers. These fledgling leaders may have been able to strengthen their positions by capitalizing on local resource imbalances and their access to scarce resources through ties with the more central basin communities (Powers et al. 1983).

Currently, there is less emphasis on redistributive exchange in this outlier concept, which has become more of a model of pan-Southwest social and exchange relationships. Judge (1990), on the basis of the Park Service's archaeological investigations within the canyon, has concluded that far more material was brought to Chaco than was redistributed to the outliers. Chaco may have been a location of ritual feasting and pot breaking for a regional population rather than an exchange center; other "outliers," may have been centers of production and distribution for certain economically important commodities. Judge also notes that outliers had lives of their own and existed before and after the Chaco System. He suggests that rather than representing Chaco colonization or conquest, outlying communities with Chacoan architecture may have been "captured" by the expanding politico-religious system through other mechanisms. Specifically, some outlier communities may have elected to join the regional system and symbolized their allegiance to the organization by constructing Chaco-style public architecture. Thus, the current trend is to think less in terms of a regional system dominated by Chaco and more in terms of a pan-regional religious/exchange organization with many state-like attributes, or conceivably even a pan-Four Corners Anasazi state.

Before proceeding, it is convenient to introduce some of the relevant terminology used in this discussion. In terms of geography, the terms "Central Basin" or "Chaco Basin" refer to Chaco Canyon and its immediate vicinity; the "San Juan Basin" or more broadly "the Basin" is that geological feature in northwestern New Mexico, south of the San Juan River, which includes the Chaco River drainage and a portion of the San Juan River drainage, and which is bounded by surrounding monoclines, uplifts, platforms, and slopes. The "Northern Periphery" refers to the area north of the San Juan Basin in southwestern Colorado; it includes Sleeping Ute Mountain, Mesa Verde, the Great Sage Plain, (the plateau and canyon country north of the Sleeping Ute near the Colorado-Utah border which drains into the San Juan River), and the river valleys and divides on the southern slope of the San Juan Mountains east of the Great Sage Plain (fig. 2). In terms of site manifestations, the terms "outlier" and "outlier community" refer to San Juan Basin or more peripheral Pueblo II Pueblo III settlements containing a great house. A great house is a planned, two-story (usually), massive block plan building with "Chacoan" room and kiva characteristics and masonry styles (Powers et al. 1983). Other public architecture (a great kiva, roads, aureolas, and earthworks) may be associated with the structure (see the "Bonito Style Community Structures: Chimney Rock Pueblo in Regional Context" chapter). "Small houses" are generally small, single story residential units with local architectural styles, usually in random arrangements (Powers et al. 1983).

PROSPECTS FOR ALTERNATIVE PROCUREMENT STRATEGIES

What are the prospects for specialized procurement strategies for certain resources within the framework of a cultural system dependent on redistributive exchange or within a regional state-like organization? Some resources, especially those vital to maintenance of the culture, may have been obtained more efficiently and dependably through supplementary means outside the normal redistributive network.

For example, it has been established that the Central Basin communities alone would have required vast quantities of construction timbers and other wood products during the effective life of the Anasazi system, or approximately A.D. 1000-1200 (Betancourt et al. 1986). Dean and Warren (1983) estimate that construction of only the 10 largest pueblos in Chaco Canyon proper consumed over 200,000 trees, predominantly ponderosa pine. Given the basically xeric conditions prevalent within the basin, procurement of construction timbers and other wood products would have necessitated a very substantial investment in labor and organization, even postulating that the groups involved could have facilitated the transportation of timbers through the outlier road network.

Betancourt and his co-authors suggest that peripheral outlier communities near large conifer stands may have provided timber as part of their contributions to the system. Alternatively, the demand may have been accommodated by regular log-procurement expeditions from the basin, aided by affiliated communities near the timber sources (Betancourt et al. 1983). The Chaco Center staff originally favored the latter possibility; Powers and his collaborators suggested that timber procurement through exchange would not have been feasible because of several logistical factors. First, the massiveness of certain earmarked timbers would have necessitated specialized transportation methods; also, size and load-bearing specifications relating to forecast construction needs would have required

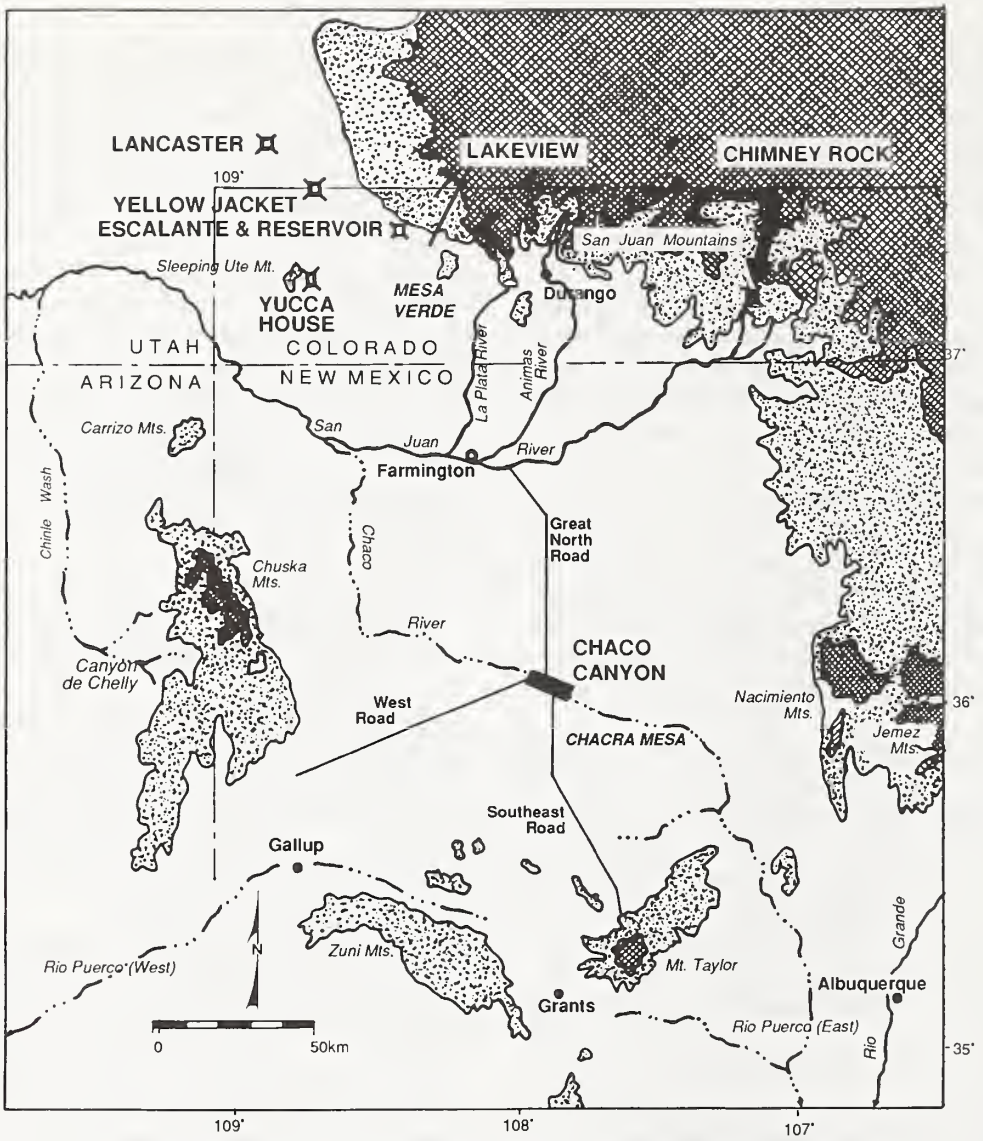

Figure 2.--The locations of Northern Periphery outlier communities treated in this paper (adapted from Betancourt et al. 1986:figure 1).

intimate knowledge during the actual harvesting. These limitations imply that timber and certain other resources were obtained through controlled long-range procurement and not through exchange. Resources in this category might include timber and other wood products, animal byproducts (hides, feathers, antler, sinew, bone, etc.), and stone and minerals for tool and ornament manufacture. Also, items not produced or available within the physical boundaries of the system (turquoise, salt, obsidian, etc.) may have been subject to other specialized procurement strategies.

There are disadvantages inherent in the "expedition" form of direct resource procurement and in exchange systems where there is no control at the source end, "foreign exchange". One primary disadvantage is that there is no certain and regular access to the targeted resource. The resource may be depleted by uncontrolled harvesting or claimed by other groups, thus rendering the expedition a failure. Procurement of the resource through foreign trade may be disrupted by shifts in social and/or political alliances, or by the economic priorities of the source community which differ from system communities. One means of coping with this problem would be to establish permanent outlier communities at critical resource locations. A permanent presence at the resource would guarantee its availability and would insure quick response to the demands of the system. These demands could be efficiently communicated to the managers at the "procurement outlier" via the road network. Such procurement communities might have been fairly simple to establish in peripheral areas removed from contemporaneous (in this case Pueblo II - Pueblo III) population centers; that is between the "spokes" or outside the "rim" of the system's or other system's "wheel" (Stuart and Gauthier 1981).

Another means of addressing the resource supply problem, inherent in expeditions and foreign trade, is to bring key foreign communities into the system so that the recipient communities

have insider access to the resource. Foreign communities could become system members through coercion, intimidation, or through more positive means if the benefits of system affiliation are communicated effectively. Once the community is "captured" by the system (this concept was developed by Lynne Sebastian, New Mexico State Historic Preservation Office), procurement of the critical resource would not be subject to the vagrancies of foreign exchange. Such practices would naturally result in the expansion of the regional system.

ARCHAEOLOGICAL IMPLICATIONS

These alternative strategies for critical resource procurement (expeditions, foreign exchange, procurement outliers, and inter-system exchange) have contrasting implications for the archaeological record. Some of the archaeological data areas where contrasts might be particularly evident include community locations in relation to natural resources and other communities, intercommunity settlement patterns, and variations in forms of public and domestic architecture.

1. Expeditions (Direct Procurement)

If the expedition was the preferred strategy, then the steady or increasing demand for system-critical resources would have necessitated regular trips to the best sources in terms of traditional access or ownership, dependable harvest, and transportation costs. In the particular case of construction timber, procurement may have been most effectively organized and managed at the community level. Variation among communities in annual volume demands and unique raw material specifications for individual structures suggest community or intra-community organizations. Expeditions might be manifest in the archaeological record as the material remnants of temporary camps located at or near the source. Such camps would be characterized by temporary, low cost shelters, and refuse attributable to the consumption and tool maintenance activities of the crews involved in procuring the resource. Also, the harvesting and initial processing of the resource might leave archaeological evidence. For example, in the particular case of timber resources, prehistoric loggers may have left certain traces of their activities at the timber stands such as caches of tree-felling and processing tools, skid trails, fossilized stumps, etc.

2. Foreign Trade

A first perception is that this strategy would have left little in the way of settlement or architectural evidence at participating communities; an absence of foreign architecture or indicative intra-community settlement patterns may suggest this strategy. There may be correlates of foreign trade in other types of archaeological data suggested by the presence of foreign items in artifact classes and the documentation of trail or road networks connecting independent communities. Dependence on foreign trade for critical resources may have led to the increasing importance and expansion of groups involved in the transportation and exchange of goods. The pan-southwest "Kokopelli" pottery and rock art motif may be evidence of the importance of foreign trade for the Anasazi system.

3. Procurement Outliers

Once a procurement outlier was established, control over the resource and its extraction and distribution would be in the hands of the outlier leaders and the more central community or communities that spawned the leadership group. The organization of a procurement outlier might be as follows: first, a managerial elite to oversee the harvesting and transportation of the resource, and to maintain effective communication with the parent communities; second, a labor force to perform the necessary harvesting and processing tasks; and third, support groups to provide subsistence goods and resource transport to the managers and the workers.

Archaeologically, procurement outliers might exhibit several specialized architectural traits. One or more Chaco-style great houses would be present, representing the residential space of the managerial groups and a location where community leadership was exercised. The great house(s) would be situated in "powerful" locations within the spatial limits of the outlier. This characteristic would translate as topographical eminences or, lacking these features, centrally located positions. The labor force would need its own small house residences. These might be quite different in form from traditional local houses, as the managerial group may have recruited or coerced the laborers from distant locations. Small houses at procurement communities might exhibit relatively low costs in materials and labor when compared to traditional small houses, as the imported laborers might view them as "temporary" housing facilities. Also, labor camp organization might not have required a full complement of domestic and ceremonial facilities. Local or distant farming groups may have been encouraged to settle near the extractive community or were lured by the advantages of a mutually profitable symbiotic relationship. These support suppliers would have settled on the outskirts of the community in traditional pueblo small house complexes.

4. Captured Outliers (Expansion of the System)

Captured outliers would contain great houses, but they may not be manifest in "powerful" locations because they would be added construction in already existing settlements. One possible location might be on the periphery of previously existing small house complexes. There would be a sizable small house component at captured outliers, but their form would be

consistent with local architectural traditions. Also, labor and materials investment in small house architecture would be normal rather than on the low "labor camp" end.

The following sections of the paper will examine a small sample of the better known large Pueblo II- Pueblo III communities in the Northern Periphery, focusing on those that have been proposed as system outliers (here termed "provisional outliers"). I believe that the architectural and internal settlement patterning at these communities can be explained by either the procurement outlier or the captured outlier model, although there must be other plausible explanations. Testing of the foreign trade or expedition models, or a survey of the Northern Periphery archaeological data for consistencies with these models is beyond the scope of this paper. The first provisional outlier considered in the small case set is the Chimney Rock community.

CHIMNEY ROCK ARCHITECTURE AND SETTLEMENT

The Chimney Rock (fig. 3) community consists of the Chimney Rock Pueblo great house, a complement of "small houses" with distinctive architecture, and in addition, a number of traditional "Mesa Verde" style pueblos. Consisting of approximately 45 ground story rooms and two kivas, the three-deep arrangement of larger rooms in 5AA83 is reminiscent of the ground plan at Salmon Ruin; perhaps each column of three rooms served as a residential suite (fig. 4). A great kiva is situated on the high mesa approximately 800 meters west of the great house.

The small houses are dispersed over the higher slopes and ridge lines of the Chimney Rock Mesa and adjacent heights, but are lower in elevation than the Chimney Rock great house. The builders and residents of these small houses again appear to have selected topographically prominent locations. As at Escalante, they are generally dispersed with gaps of 20 or more meters separating individual small houses near the apex of Chimney Rock; further down the slope to the south, 50 or 100 meters may separate individual dwellings (fig. 5). Some clusters of two-to-three wall-sharing houses are situated near the top of the mesa.

In form, the Chimney Rock small houses are unique for the Colorado Outliers (figs. 6 and 7). Lister and Breternitz have coined the term "aboveground pithouses" for these structures (Eddy 1977). This appellation appears appropriate given the absence of sipapus, benches, pilasters, and other standard kiva features, and an apparent domestic function based on the evidence from excavation. Six of the structures were excavated by the University of Colorado in 1970-1972 (Truell 1972; Eddy 1977). Here they are more simply referred to as "crater houses," which reflects their surface appearance. Each crater house consists of a circular living room with masonry walls; often, smaller rectangular storage and processing rooms are attached to the west and/or north sides (Eddy 1977).

The total architectural and material complement of individual crater houses are suggestive of single family residences. Some of the more peripheral houses are very small and of very simple construction; they may have served as domiciles for smaller subfamily groups or individuals, or may represent seasonally used quarters. Approximately 120 crater houses have been recorded on the Chimney Rock Mesa and smaller complements are present on the slopes of Pyramid Mountain and in the Peterson Gulch area west of the Piedra River.

There are analogues to the Chimney Rock small houses, not in Colorado, but in the Largo-Gallina area of northwestern New Mexico (Gomalak 1990). Thus, Chimney Rock may represent an already existing Largo-Gallina community that was "captured" by the regional system, or a location where Largo-Gallina peoples were recruited by system leaders to establish a procurement outlier. There are some anomalies in the Chimney Rock small house complement which are important in terms of testing the models suggested in this paper. One topographically prominent "small house" at Peterson Gulch has been partially excavated by a pothunter; the exposed architecture is indicative of a Chaco or Mesa Verde style c-shaped pueblo rather than a traditional crater house. Also, there is a large ruin complex at the apex of Pyramid Mountain. This has not been investigated, so it has not been determined whether the complex is a cluster of crater houses or is another architecturally distinct component of the community. The dominant topography of these two units may indicate a specialized function within the community.

Numerous traditional pueblo units are located on the bluff along the Piedra River below the great house and Largo-Gallina small houses located on the mesa. Recent investigations (Mobley-Tanaka 1990) suggest these units date to the Pueblo I period. Hence, they are not germane to this discussion except as the possible antecedents of the later Pueblo II-III Chimney Rock community.

CHIMNEY ROCK: AN ANASAZI LOGGING TOWN

In reference to Chimney Rock and Anasazi system resources needs, I suggest that this particular outlier was established in response to the system's voracious demands for timber resources, specifically for the construction lumber by communities with no convenient source. The idea that lumber was a major item of exchange between Chimney Rock and the Basin is not a new one (Truell 1975, Tucker 1981); however, the theory that Chimney Rock was founded particularly for this purpose is carrying previous hypotheses a step further. Betancourt et al. (1986) has established the Central Basin's demands for large quantities of timber. Other system communities in the larger San Juan Basin would have had similar construction material needs and may have sought more distant sources after the depletion of local stands. Betancourt et al (1986) suggest that Central Basin builders would have depleted

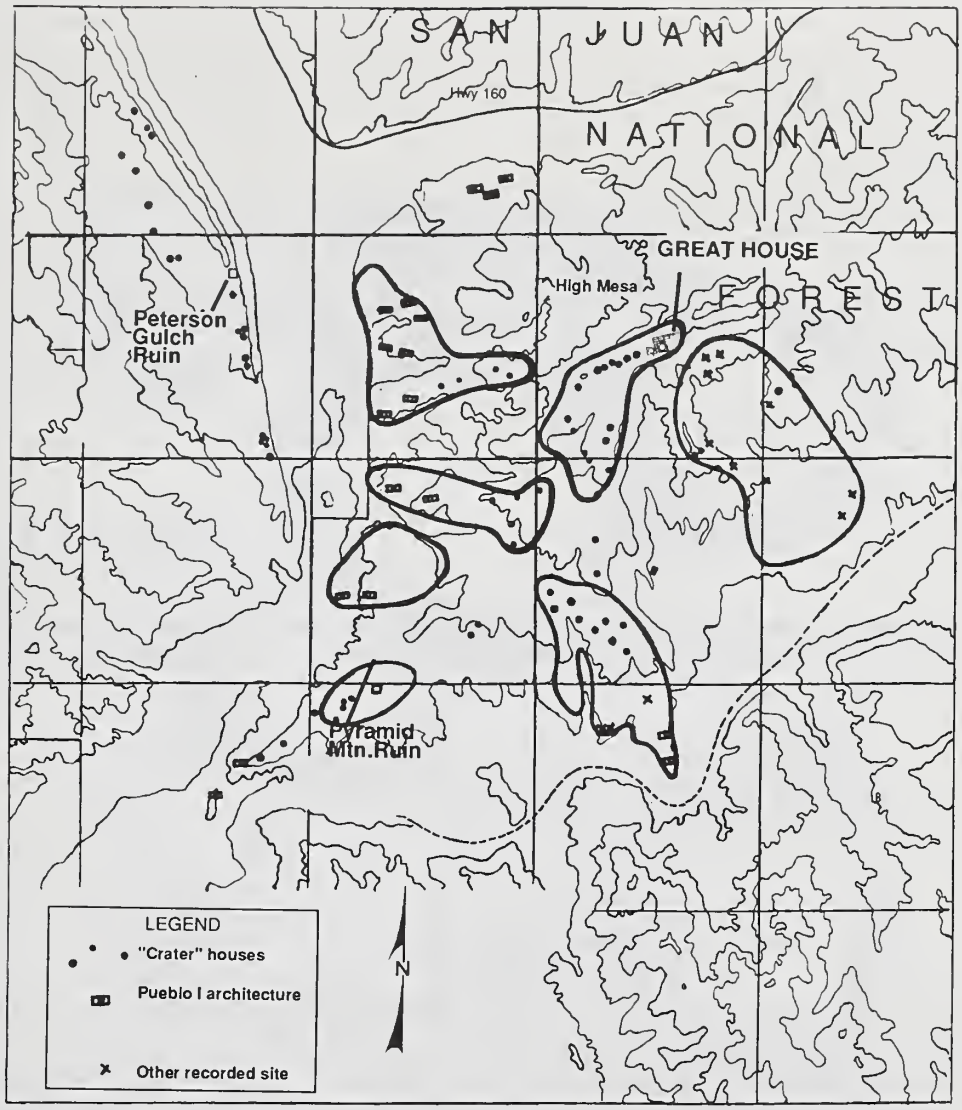

Figure 3.–Plan of the Chimney Rock Outlier (adapted from Eddy 1977:figure 4).

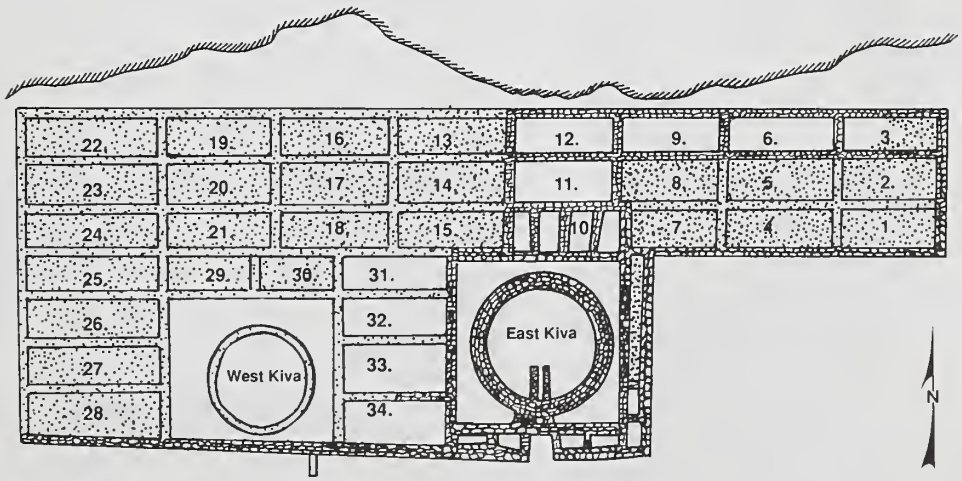

Figure 4.—Plan of Chimney Rock Pueblo, the great house within the limits of the Chimney Rock Mesa community; unexcavated portions are stippled (from Jeancon and Roberts 1924:Plate XII).

Figure 5.—The distribution of "crater" small houses near the apex of Chimney Rock Mesa; excavated sites are depicted by wall outlines, unexcavated houses by dots.

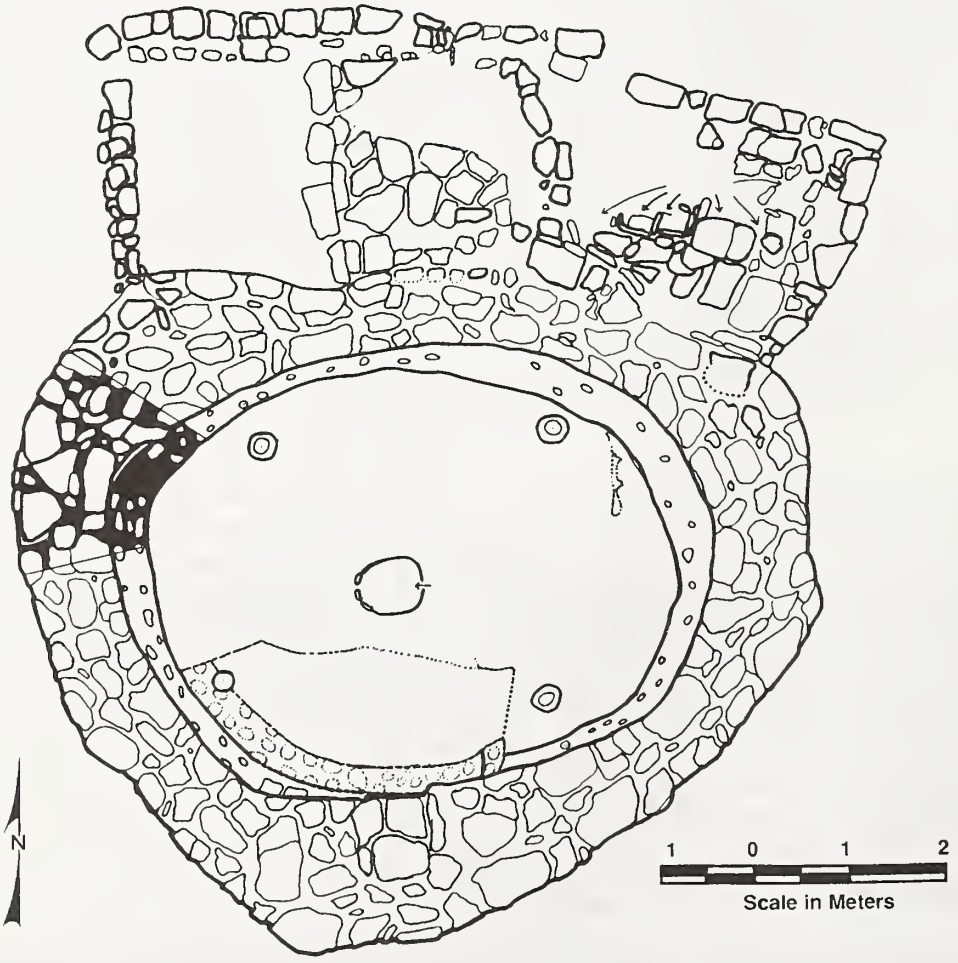

Figure 6.—Plan of single crater small house (5AA88, Building 16; from Eddy 1977; figure 29).

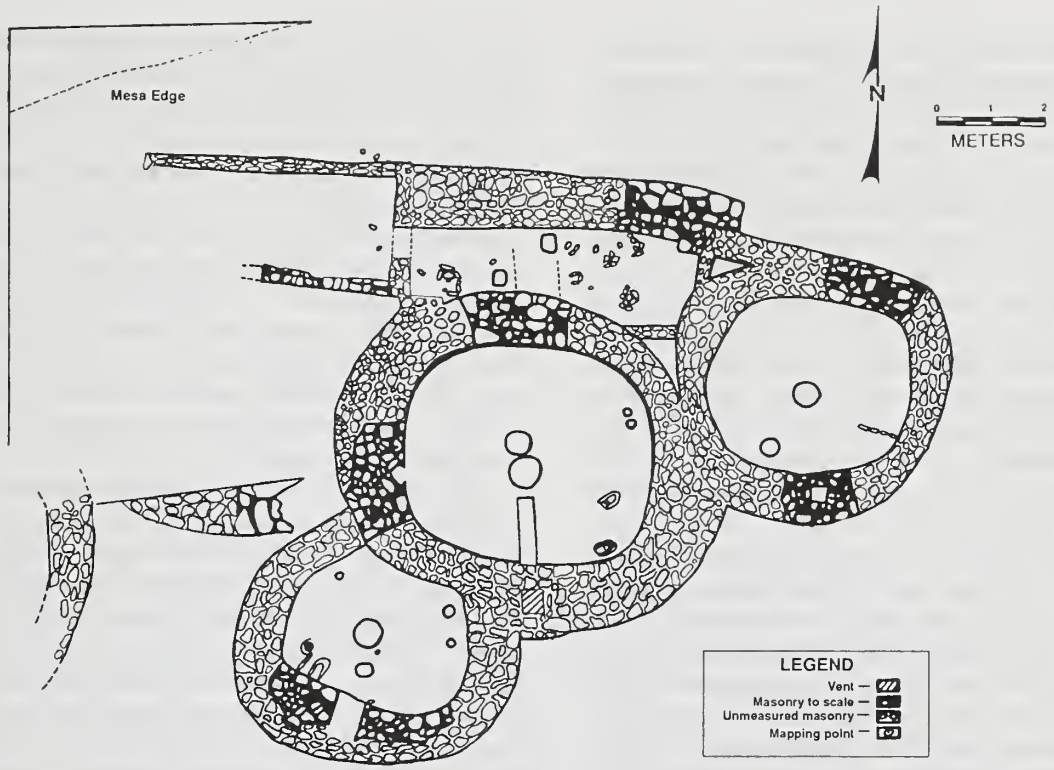

Figure 7.—Plan of adjoining crater houses at Chimney Rock.

nearby stands of ponderosa pine by A.D. 1030. Then, the basin residents would have had to satisfy their lumber needs by journeys to more distantly located mixed conifer and alpine forests. They suggest Mt. Taylor and the Chuska mountains as likely sources of the desired large conifer timbers during the 11th century; both mountain massifs are connected to the Central Basin area by major prehistoric roads; this would have facilitated transport of harvested lumber. After A.D. 1100, timber procurement may have shifted to the Northern Periphery, coincident with the establishment of new communities along the San Juan River and its northern tributaries.

Establishment of Chimney Rock is consistent with an 11th century Anasazi system characterized by increasing demand for timber and dwindling local supplies. Not only did the primary scene of harvest shift to the north, but it is likely such activities were consolidated under the authority of a single or a few management groups. This may have happened in an effort to make timber procurement more efficient in terms of cost and more responsive to needs, or perhaps it may reflect the initiative of a few enterprising groups. Although it is farther from the central basin than the southern and western mountains (135 versus 80 air km), Chimney Rock would have offered several advantages to potential timber harvesters.

If the Anasazi environment was similar to today's in terms of forest locations, then large stands of ponderosa would have been accessible on the lower slopes of the Chimney Rock Mesa and in the bottoms of tributary canyons feeding to the Piedra River. The distribution of the ponderosa pine forest near Chimney Rock would have been very convenient to the timbering crews (they would not have had to cope with steep mountain slopes), and may partially explain the particular location of the Chimney Rock settlement (coincident with the southernmost convenient stands of ponderosa pine in a natural travel corridor). Once harvested, the timbers could be carried or dragged to the nearby Piedra River, tied together in rafts, and floated on the Piedra and San Juan Rivers to Salmon Ruin and the terminus of the Great North Road. Laborers could possibly have carried the timbers to those needy system communities via an Anasazi road tying Chimney Road with the Basin. These advantages in terms of convenient access and cheap transportation could have made Chimney Rock competitive with the Chuskas and Mt. Taylor, especially if the most convenient stands in the latter areas were depleted.

The dates of the Chaco (Anasazi system) presence at Chimney Rock are consistent with the procurement outlier model. Tree-ring dates recovered from the Chimney Rock great house suggest the last major construction occurred in the last decade of the 11th century (Eddy 1977); there is good tree-ring evidence that room 8 and the upper East Kiva were constructed in 1076. Abandonment is estimated about A.D. 1125 (Eddy 1977). The exact date of great house construction at Chimney

Rock is immaterial to this hypothesis; the crucial point is that the house was constructed in the last part of the 11th century coincident with the period of timber scarcity in the Basin.

Did the builders of the great house (the timber town managers) recruit or coerce a labor force to perform the necessary harvesting, processing, and transportation integral to a logging industry? Or, does the construction of Chimney Rock Pueblo merely signal the incorporation of another already existing community into the regional system? The construction dates for the crater small houses are important in this regard. The best source of dating inference, tree-ring dating, provides supporting but not conclusive evidence. Eddy (1977) supplies tree-ring dates for the smaller sites at Chimney Rock. Room 2 at Building 16 (a crater house) was apparently constructed in A.D. 1077, only one year later than the lower east kiva at the great house.

The other three structures with tree-ring data (the great kiva and two crater houses) yielded specimens with outside rings (not cutting dates) in the 1070's and 1080's. These certainly fit very well with the dates from the great house. As Eddy (1977) remarks: "At all three sites, the tree ring assays the latest construction and not the earliest." Of course, this statement is true for the great house as well as the small houses. While there is a substantial Pueblo I component in the Chimney Rock area, there is no demonstrated sequence of architecture or superposition between this earlier occupation and the later Chimney Rock Phase community of the 11th and early 12th centuries. In fact, the Pueblo I occupation is located on the lower ridges close to the river, while the Chimney Rock Phase occupation is concentrated on higher elevations.

Of course, there may have been a smaller existing community that was enlarged substantially by the timber town managers. Taken at face value, the tree ring and stratigraphic data recovered thus far from Chimney Rock strongly support the procurement outlier model. The great house and the Largo-Gallina style small houses appear to have been constructed in a virtually simultaneous fashion in the 1070's. The lack of superimposed structures and deposits for early (Pueblo I and Pueblo II) refuse on the mesa supports a hiatus in occupation between the middle 10th century and the late 11th century great house--small house construction. However, more clarification of the occupational sequence through excavation is needed before a certain conclusion can be made.

Excavation data provides some independent evidence which supports the "timber town" hypothesis. Pollen studies reveal a reduction of arboreal pollen from A.D. 1050-1100 (Buge and Schoenwetter 1971; Eddy 1977), this reduction suggests a retreat in forest and woodland habitats during the late 11th century. The authors of the pollen study attribute this reduction to increasingly xeric conditions, but it appears that reduction of the conifer stands by prehistoric timber crews is a plausible alternative explanation. Wood identification studies conducted by the Laboratory of Tree-ring Research (reported by Eddy 1977) illustrate that the local resident groups were using ponderosa pine, Douglas fir, true fir, juniper, and aspen in construction of their own dwellings. Robinson, in a personal communication to Eddy (see Eddy 1977), comments on the probable presence of a young ponderosa forest at Chimney Rock. Such a forest would have been a preferred target for the system's timber industry, as young ponderosa apparently was preferred by the architects of the Basin towns (Betancourt et al. 1986).

One question regarding the locations of system timber procurement is why procurement activities were not focused at possible sources in the north that were closer to the Basin, for example in the Animas Valley. I believe that because of the voracious appetite of the Anasazi for timber, these superficially more appealing locations would have been depleted or claimed by local communities, and hence did not constitute a real option. The Animas Valley would have been convenient to Mesa Verde populations, and for Mesa Verde and surrounding areas, there is a demonstrated continuum of occupation from Pueblo I through Pueblo III times. Thus, there would have been a continuing demand for timber from these populations, and constant harvesting of the most convenient local sources. If the eastern portion of the northern periphery, including the Piedra River drainage, was abandoned circa A.D. 900-950, then the local forest ecosystems would have had time to recover before reoccupation. Because the recovering stands in the east were further removed from northern Pueblo II population centers, harvesting pressure would have been of lesser intensity or nearly absent. This reconstruction is consistent with the presence in the eastern area of a young ponderosa forest as noted by Robinson.

If the crater small-houses are truly the residences of the groups actually involved in timbering, then a considerable force was involved, even if some or most of the occupation was seasonal in nature. Over 150 individual crater houses have been identified and more are no doubt present, and one or more individuals from each residence could have been involved in the timbering effort. Timber harvesting activities may have spanned several generations, which is consistent with the 50 year or so hypothesized life span for the community. Even allowing some accommodation for less than 100% simultaneous occupancy for the crater house dwellings, it is possible that more than 100 individuals could have been active in timber harvesting during the community's heyday.

This labor pool could have produced one thousand to several thousand structural timbers annually, assuming only one timber per man-day (even with only 50 individuals involved with harvesting timber, it would only take 20 working days to produce 1000 timbers given the one timber per man-day rate). Of course, trimming of individual timbers, transportation to the river, and preparation for raft transport would also have necessitated some labor investment. These simple calculations suggest that Chimney Rock may have been able to meet most of the demands from the Central Basin and the San Juan River communities; thus, the Chimney Rock settlement may have been a major supplier, if not the major source of timber products for the Basin portion of the system during the late 11th and early 12th centuries.

A SURVEY OF OTHER COLORADO OUTLIER CANDIDATES

A limited sample of other known or suspected northern periphery (Colorado) outlier communities is considered here for evaluation of the procurement models. The Colorado sites are Yucca House, Yellow Jacket Ruin, Lancaster (Clawson) Ruin, Escalante and Reservoir Ruins, and Wallace Ruin. Yucca House, Escalante, Wallace and Chimney Rock are cited in the Chaco Center's outlier survey study (Powers et al. 1983); each ruin complex contains a confirmed great house. The inclusion of Yellow Jacket, Lancaster and Reservoir Ruins in the Colorado Chaco Outlier case set is based on less firm footings; a fair case for affiliation with the regional system can be made based on the likely presence of great house-great kiva complexes.

Yucca House (fig. 8) is situated on the lower east slopes of the Sleeping Ute Mountain about 90 air km northwest of Salmon Ruin. The Yucca House pattern of residential and other architecture is similar to provisional outliers in the Great Sage Plain, but the Plain is 20-30 km to the north. Yucca House commands a strategic position between the Basin communities to the south and the Plain population centers in the north. A two-story double kiva great house is situated in the center of the architectural complex, and what may be a great kiva depression is located directly to the south. This managerial-ceremonial nucleus is surrounded by a small house aggregate, manifest as one-story traditional "Mesa Verde" style residential units. The term "small house" is somewhat misleading here, as some of the larger single-story room-blocks measure more than 75 m in length and contain between 5 and 8 kiva depressions. Generally, the largest small house complexes are situated near the center of the community, and smaller complexes (one or two kiva units) are located on the perimeters of the central area.

The main Yucca House complex is surrounded by a more distant complement of small houses within a few km. Some of these units, excavated by Grinnell College in the 1970's, consist of small single-story masonry room-blocks, with two periods of occupation, in the 1100's and the 1200's (Luebben 1983, 1985). The large compound-like structure on the east side of the main community, prominent in Figure 8, may be the terminus of a prehistoric road; a similar structure is present at the terminus of a Chaco road near Window Rock, Arizona (the Grey Ridge site). However, the compound at Grey Ridge may be late (13th century) construction (John Stein, personal communication). If the structure at Yucca House is analogous, this may explain a 1200's tree-ring date recovered from the Yucca House area (Dean and Robinson 1975), which may be indicative of a major late occupation at this outlier.

The Yellow Jacket Ruin (fig. 9) is an outlier candidate that is located in the Great Sage Plain about 25 km north of present day Cortez and about 35 km north of Yucca House. A possible great house and associated great kiva are situated to the north of the main residential complex and are at the north end of a north-south "street" that passes through the center of the main architectural complex. The small house room-block units in the central complex are again comparatively large, some measuring approximately 100 meters in length with 910 kivas.

Wheat (1983; Lange et al. 1986) has argued that the high kiva density at Yellow Jacket is inconsistent with the outlier interpretation, and instead views Yellow Jacket as a local ceremonial center. However, the architectural expression of the

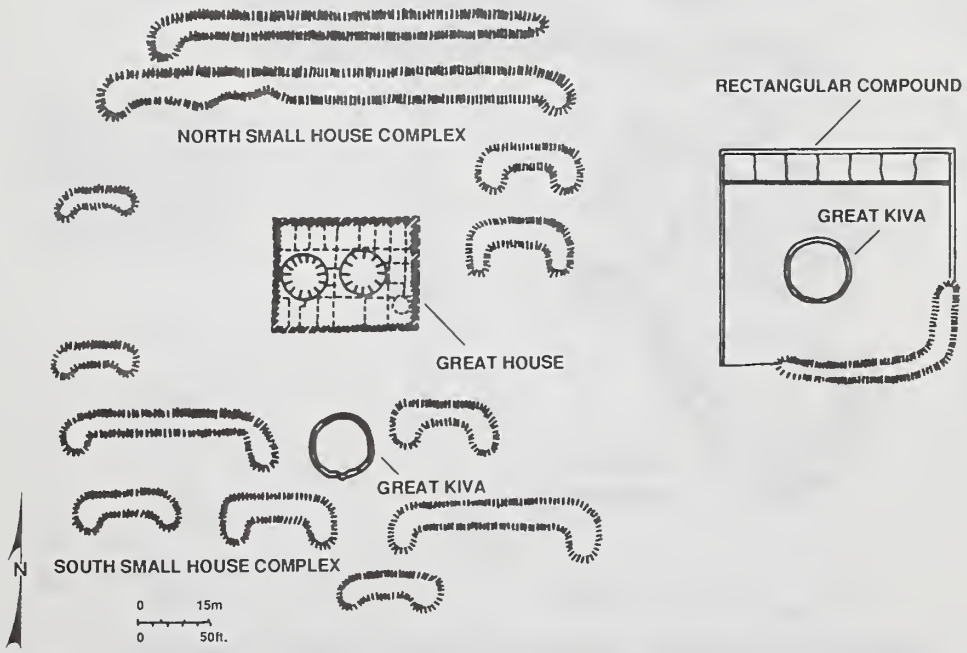

Figure 8.–Sketch plan of the Yucca House Outlier (locations and dimensions of small house units are approximate.)

northern two-thirds of the community seems wholly consistent with the architectural expectations of the system expansion model, postulating an incursion by an in-system group into an already existing aggregated Mesa Verde style settlement. The southern third of the main complex is architecturally distinct and does contain a very large number of kivas, some of which are not associated with surface room-blocks. Rather than indicating an 11th century ceremonial center, I suggest that the southern portion of this settlement is a late (post A.D. 1150) phenomenon contemporaneous with the compound at Yucca House.

The Lancaster (Clawson) Ruin (fig. 10) is a third large Mesa Verde style small house settlement with a possible associated great house; it is located about 13 km northwest of the Yellow Jacket community and about 45 km north of Yucca House. Here, the separated two-story architectural complex, thought to be a great house, is located to the southwest of the residential center; perhaps it was constructed after the establishment of the aggregated small house complex. A large depression indicating the location of a great kiva has not been identified at this particular community.

These first three examples and perhaps at least eight other large Pueblo III settlements in the Plain (Blanchard Ruin, the Goodman Point Community, Black Ruin, Herren Ruin, the Lowry Community, Cahone Ruin, Squaw Point Ruin, and Bug Point Ruin) may conform to the architectural expectations for peripheral outliers "captured" by the regional economic system. All may contain a great house and a complement aggregation of small house residences. Some of the latter are very large, indicative of high local population levels. Other Colorado outliers exhibit quite different architectural patterns, as the descriptions for the other three sample communities will illustrate.

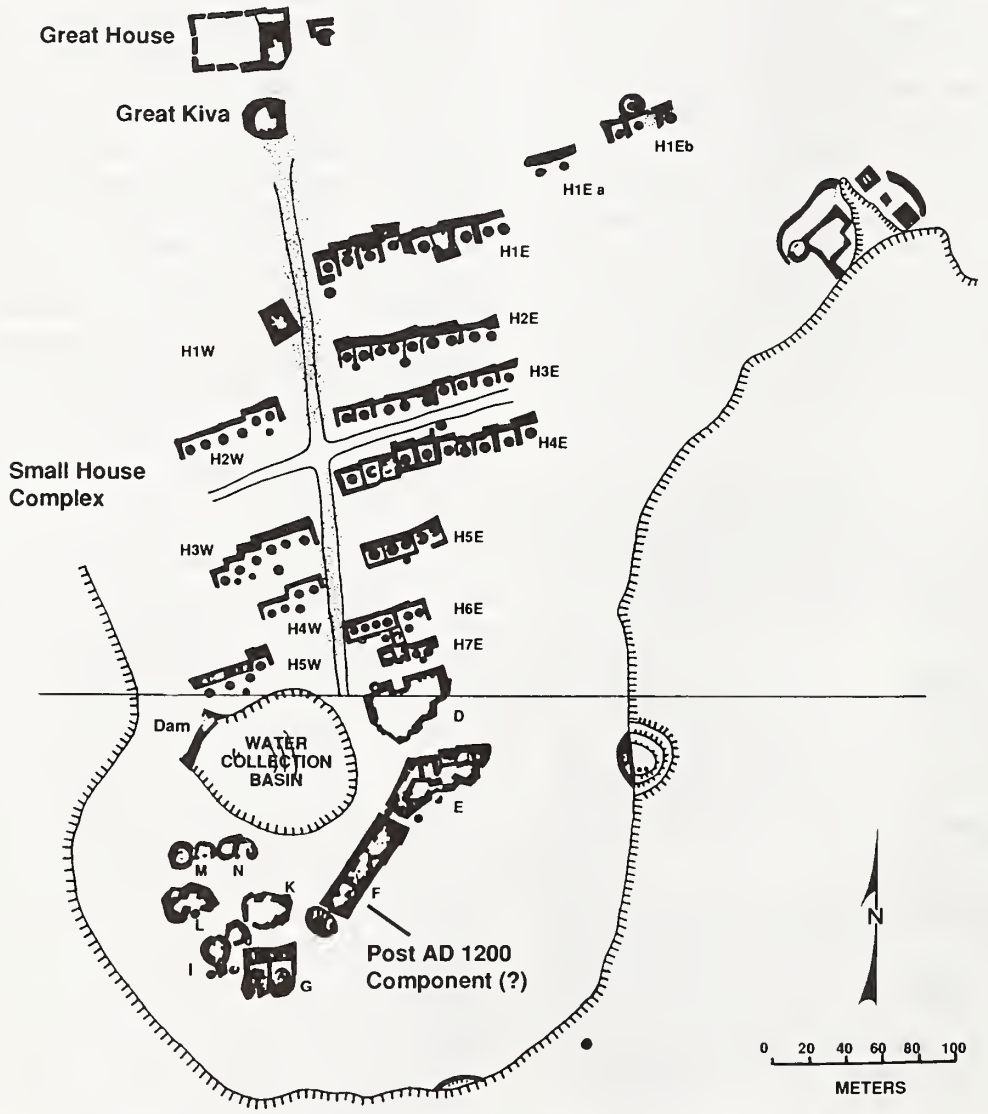

Figure 9.—Plan of the Yellow Jacket Outlier (sketch map by Joe Ben Wheat).

The Escalante Community (fig. 11) is situated on a prominent hill and adjacent upland area overlooking the Dolores River Valley to the north; it is about 30 km northeast of Yucca House. The community contains at least two great houses; one is the Escalante Ruin itself (fig. 12), a planned great house structure with approximately 25 ground story rooms. Surrounding the Escalante on the west, south and east sides is a complement of small-house residences. These contrast with the comparable structures at the Yucca House, Yellow Jacket, and Lancaster Communities. Each small house apparently consists of a single pit-structure or kiva and less than half a dozen surface rooms. These small dwellings are dispersed on the slopes and around the base of the Escalante hill; topographical advantage over nearby terrain may have been a factor in determining individual locations.

Two small houses within the Escalante Community have been excavated (figs. 13 and 14): the Dominguez Ruin by the University of Colorado (Reed 1979), and Casa de Suenos by the BLM (Douthit 1983). These particular small houses are characterized by simple construction methods and relatively low investments in materials and labor. The house kivas (fig. 15) may also have served as domestic spaces, as the associated surface rooms lack a full complement of domestic furniture.

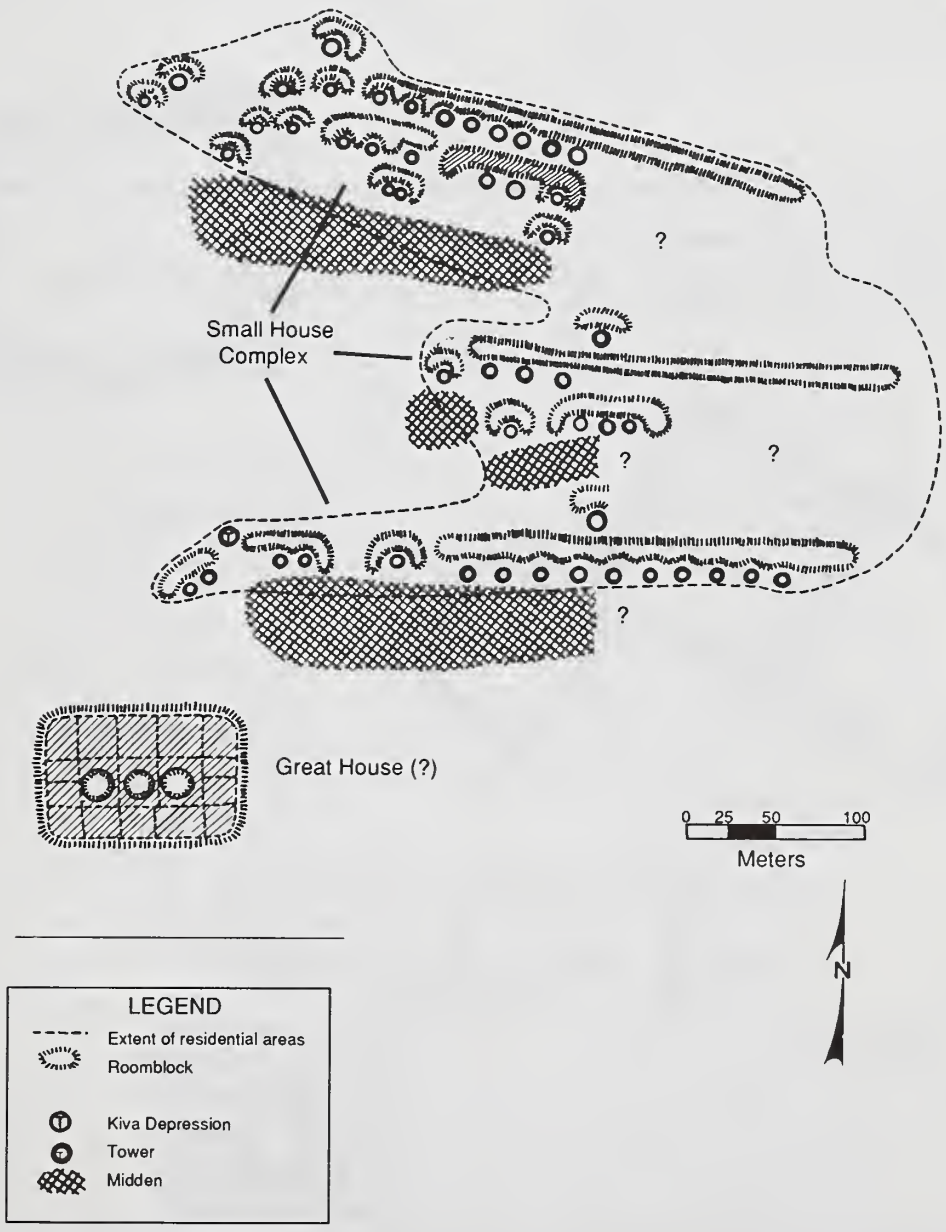

Figure 10.—Plan of the Lancaster community, a possible outlier (east portion of plan is conjectural).

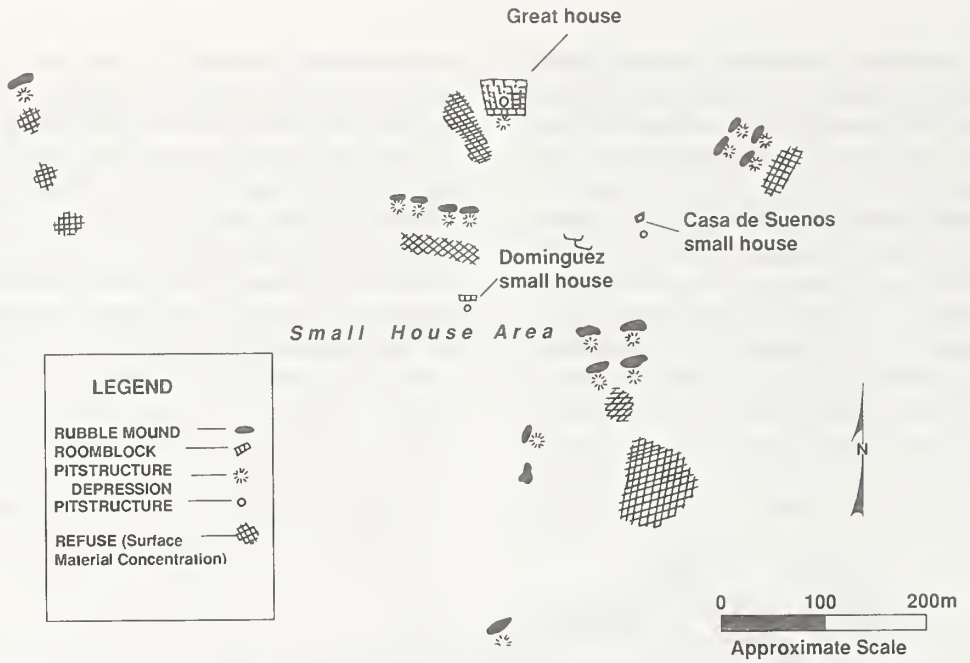

Figure 11.–Plan of the western (Escalante) complex at the Escalante Reservoir Outlier (adapted from Kane 1986: figure 5.6)

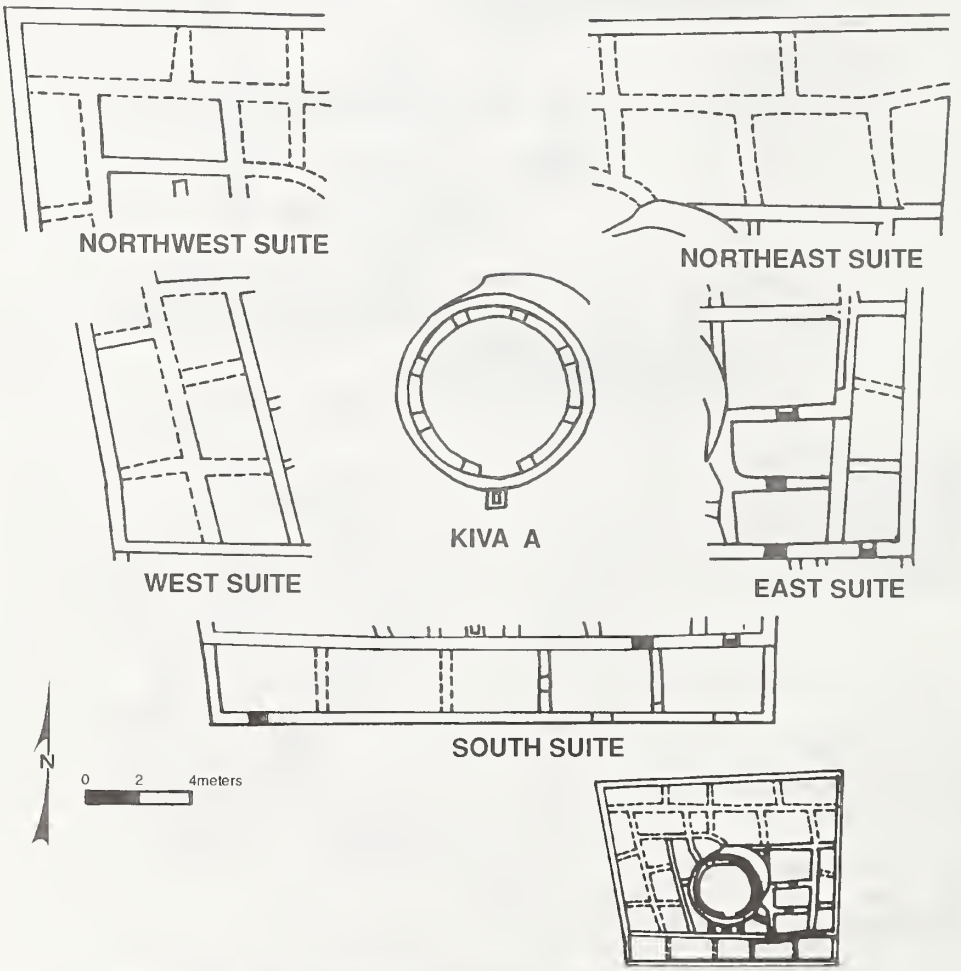

Figure 12.–Interpretive plan for Escalante Ruin.

Located just to the east of Escalante and its small houses is the Reservoir Ruin complex (fig. 16). This consists of a possible great house and great kiva, a separate tri-wall structure, and an aggregation of small houses; the latter appear to be more in the traditional "Mesa Verde" style although they are small units (1-3 kivas) when compared to other provisional outliers. Kane (1985) suggests an 11th century occupation for the Reservoir group based on surface ceramics; here it is assumed the presence of the Chacoan great house and the comprehensive patterning of architecture for the entire complex imply a later date coeval with the other outlier communities in the Plain. The tri-wall structure may indicate a late 12th and early 13th century occupation at this community; this would be consistent with suspected post-Chaco occupations at other outlier communities, notably Yucca House and Yellow Jacket.

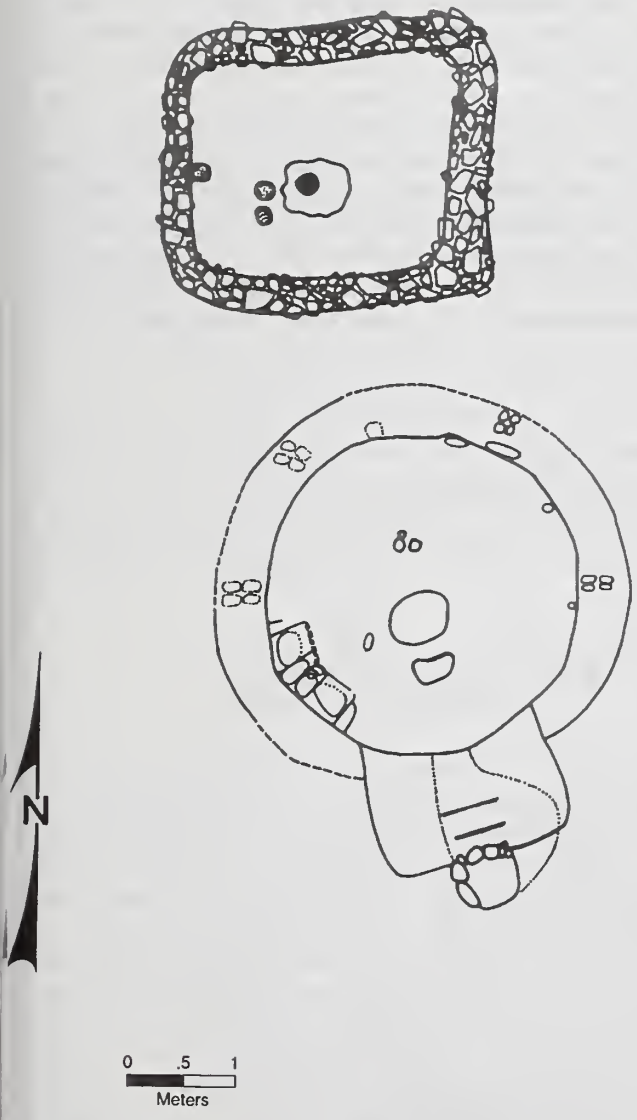

Figure 13.–Plan of the Casa de Suenos small house (from Douthit 1983: figures 10 and 17).

Wallace Ruin (see the "Wallace Ruin: Implications for Outlier Studies" chapter) is situated in the eastern part of the Montezuma Valley, about 25 km east and somewhat north of Yucca House. Wallace is part of the larger "Lake View Group" community, which, in addition to Wallace, consists of two other great houses (the Ida Jean site, refer to Brisbin and Brisbin 1976; and the Haynie Ruin), and a complement of small houses (Bradley 1988). Wallace Ruin itself is a "classic" E-shaped great house with approximately 50 ground story rooms and two apparent Chaco-style boxed-in kivas. The site has a complex construction history with the major building events occurring in the 11th and early 12th centuries, with a major post-Chaco "Mesa Verde" refurbishing and reoccupation in the late 12th or early 13th century (Bradley 1986). The small house complement of the community has not been systematically recorded. The small houses are manifest in a dispersed pattern, apparently similar to the small house patterns at the Escalante-Reservoir Community.

SUMMARY OF THE DATA SET

The Escalante Reservoir, Chimney Rock, and Lake View communities share certain characteristics in architecture and internal patterning and are distinct when compared to their

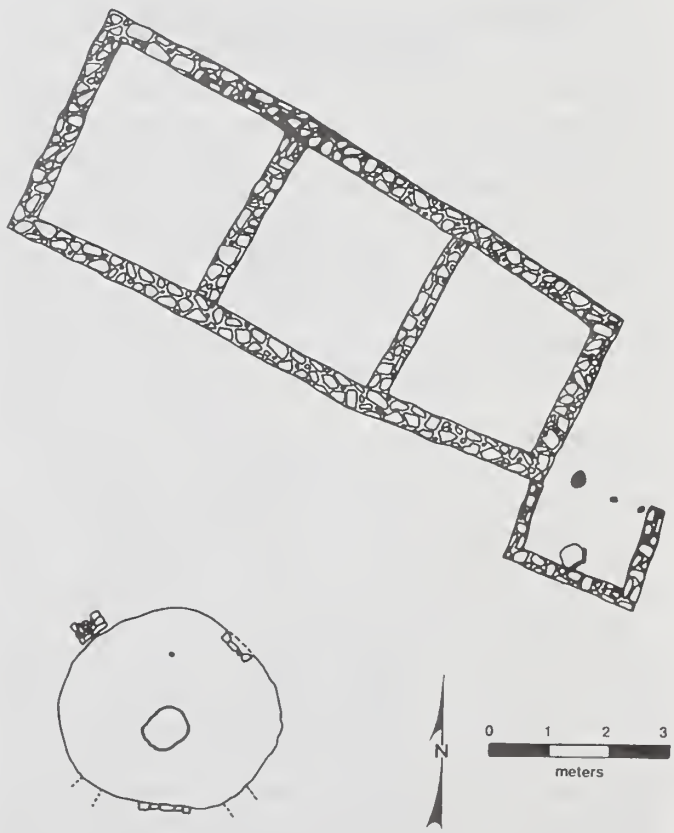

Figure 14.–Plan of the Domingues Ruin small house (from Reed 1979: figure 2).

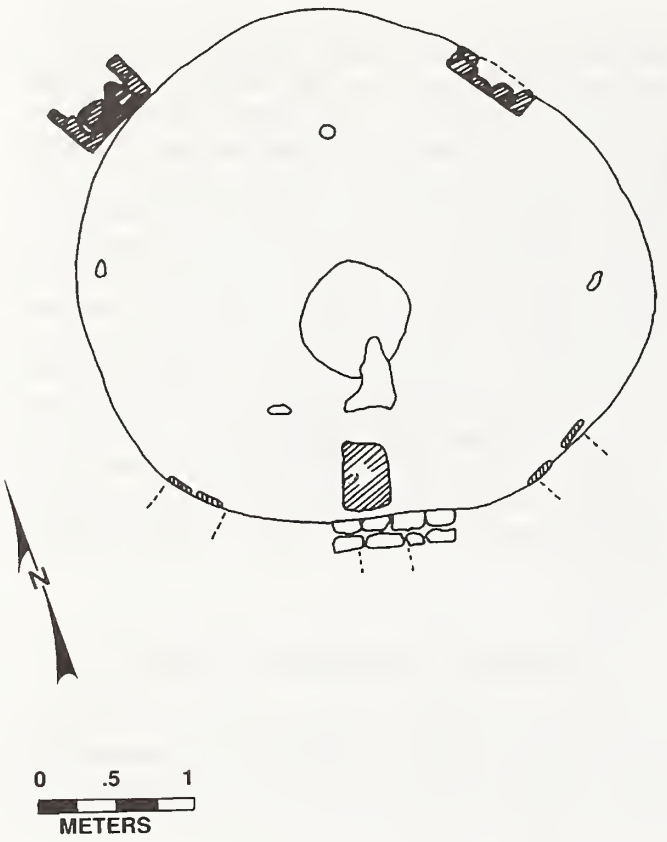

Figure 15.–Plan of the Dominguez pitstructure (from Reed 1979: figure 9).

coeval counterparts in the Great Sage Plain. It is suggested that the settlement and architectural patterns observed at these complexes correspond in many respects to the expectations of the procurement outlier model. The following are the most salient points of similarity.

First, these outliers contain two or more great houses (further work must be done at Chimney Rock to determine whether there is more than the one verified great house). At Escalante and Chimney Rock, the great houses are located on the most topographically prominent locations possible; this suggests the presence of an elite class with social power.

Second, the characteristics of the dispersed small house units (low investments in materials and labor, lack of formal ritual/ceremonial features, size and content consistent with use by small household or sub-household groups) are suggestive of a separate labor class within the outlier communities.

Third, the distribution of the different structures (great houses on prominences, dispersed small houses on the lower slopes) is consistent with the expectations for a managerial elite and a labor force engaged in harvesting and processing natural resources.

Fourth, each provisional resources outlier is located on or near what would have been the "frontier" for the period, and each had convenient access to supplies of natural resources beyond the boundaries of the regional system (that is, resources outside the immediate catchments of other local communities). Some of the architectural attributes of these provisional outliers have implications for the social structure and origin of the

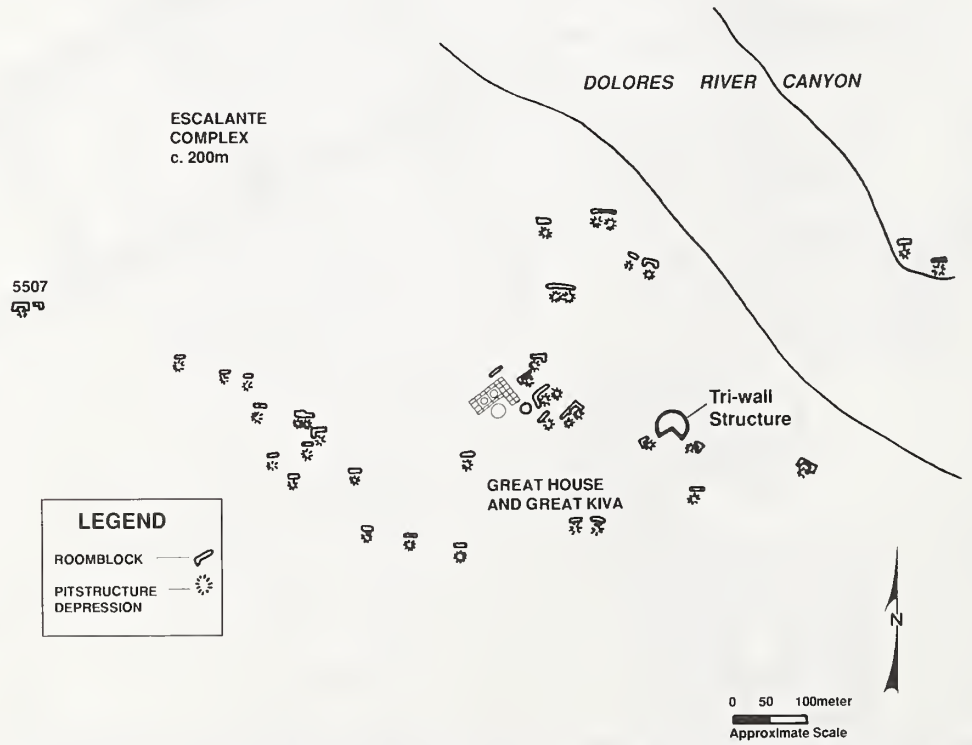

Figure 16.–Plan of the eastern (Reservoir) complex at the Escalante Reservoir Outlier (from Kane 1986:figure 5.4).

communities. For example, does the documentation of the presence of two or more possible great houses at a community mean that different or rival factions within the regional organization were represented at each location? Because the great houses at these particular provisional outliers are situated at "powerful" locations (either in close proximity to the geographical center, and/or occupying the best topographical points), does this indicate establishment of the great houses first, and then simultaneous later recruitment or importation of the labor force with subsequent construction of the small houses?

Architectural and locational similarities among the other Colorado Outliers considered here (Yucca House, Yellow Jacket and Lancaster) include only one great house, small houses arranged in long linear room-blocks often with seven or more kivas, great houses situated on the periphery of the main residential complex (Yucca House is an exception) and locations well within the hypothetical territorial boundaries of the regional system. The inference is that these complexes conform to the expectations of outlier communities recruited or "captured" by the regional organization after local origin and a fairly long initial period of internal growth. The great houses are in peripheral, relatively non-powerful locations because they were added to already substantial residential complexes. If the indigenous population constructed the great house to symbolize their new allegiance with the regional organization, they would not destroy part of the existing residential complex. The aggregated room-blocks are suggestive of a continuing growth process whereby individual units are added to the ends of already existing pueblos, or new room-blocks constructed on the periphery of the community. The individual household apartments show none of the labor-scrimping and cursory construction which is so evident at the provisional procurement outliers. Here it is suggested that the great houses were grafted into already substantial communities, and that resource procurement was not a factor in their origin or function within the regional organization.

SAGE PLAIN COMMUNITIES AND THE REGIONAL SYSTEM

It is proposed that the Pueblo II/early Pueblo III Anasazi communities described in this paper were an integral part of the larger regional system. Given that these communities were not procurement outliers, what mutual benefits resulting from annexation could accrue to the organization and to these particular communities? Based on its higher annual precipitation and large expanses of fertile mesa top soils, the Plain probably had greater agricultural potential when compared to the Basin. Petersen's reconstruction of prehistoric climatic trends in the Plains area suggests very favorable weather conditions for agricultural production in the 11th and early 12th centuries (Petersen 1988). Thus, the Plain may have functioned as a "breadbasket" for the remainder of the regional system during years characterized by warm temperatures.

Surplus Plain produce, above the demands of the local populace, could have been transported to the basin and bartered in open markets (Toll 1978). Sage Plain population levels were very high during the 11th and early 12th centuries; for example, Rohn (1989) has estimated that the population for only the Yellow Jacket community was between 3,000-4,000 persons during the early 1100's. Thus, the local communities possessed the production force necessary to generate large agricultural surpluses during periods of favorable climate; also, the large endemic population could be tapped for other forms of labor beneficial to the larger system through recruitment or coercion.

The distribution of the largest Plain communities suggests they could have been served by a road network similar to that known for the Basin, and in fact, traces of such a Sage Plain road network have been discovered recently (several roads enter a large residential complex at the Lowry community, for example; Judge 1991). Because of the formidable natural barriers to the south of the Plain (Ute Mountain on the west and the Mesa Verde to the east), transportation routes connecting the Plain and Basin would have necessarily traversed the southern Montezuma Valley in the vicinity of Yucca House. The strategic position of this outlier and the likely presence of a road terminus within the community suggest that Yucca House may have been a major staging point and temporary housing facility for in-system traders and commodities shuttling between the two population centers.

The large endemic population of the Plain and its distribution in large well-organized nucleated settlements has implications for the nature of Plain to Basin relationships. The Sage Plain centers may have been managed or controlled by a Basin elite, or influence may have been limited to construction of sumptuous quarters for local leaders presumably to illustrate allegiance. In either case, the Plain groups may have possessed power on the same scale as their Basin counterparts given the former's greater potential for agricultural production and the northern ability to control and manipulate a large labor force. The leaders of the largest northern communities may have used this inherent potential to further their own social and economic goals. Thus, the Plain and Basin may have been partners or equals in the greater Anasazi system.

I have suggested that the Escalante Reservoir and Lakeview communities were established as procurement outliers within the Anasazi system in the same fashion as Chimney Rock. If this is so, what important resources in the context of the system were targeted? The Escalante Reservoir Outlier may have had a role in satisfying system wood product demands, although it is probably wrong to assume that timber was the sole targeted commodity. Animal products, especially those from large forest-dwelling herbivores (hides, antler, bone, dried meat, etc.) are other likely commodities. Escalante is conveniently located in respect to the Dolores River Canyon area and the heavily forested uplands to the northeast. Consequently, community residents had easy access to the resources of the canyon and upland habitats, including stands of ponderosa pine and other

large conifers. Some ponderosa beams were used in the construction of the Escalante great house structure, perhaps indicating local availability of this species (Hallasi 1979).

The inferred construction dates for Escalante are intriguing: the investigators suggest A.D. 1129 for initial construction of the great house with a refurbishment in A.D. 1138, based on available tree-ring data (Hallasi 1979). This compares favorably with the proposed A.D. 1125 abandonment date for Chimney Rock. Perhaps the system's primary timbering operation was shifted from its northeastern periphery location after A.D. 1125.

Factors that might have a bearing on a possible relocation include exhaustion of the easily accessible timber stands at Chimney Rock, lessened post-1125 demand, and security factors. During its period of occupation, Chimney Rock was apparently the only large Anasazi settlement within a 50 km radius, and its isolated position may have caused it to be vulnerable to foreign raiders. Lesser construction demands in the mid-12th century (final construction at Chetro Ketl was A.D. 1116; at Kin Bineola A.D. 1124, and at Pueblo Pintado A.D. 1126 (Vivian 1970) would have allowed consolidation of timber production with the conduit for agricultural produce from the Great Sage Plain, if timber procurement operations were relocated to the northwestern periphery.

Processed timbers and other wood products could have been transported to the Yucca House and then to the San Juan River communities and points further south. The potential labor force at Escalante was apparently much smaller than that at Chimney Rock; only 20 of the simple small houses thought to represent the dwellings of the labor force have been identified at the former.

Lakeview may have functioned as a different cog in the system. Excavation in some of the Chaco-style rooms at Wallace yielded extremely large quantities of animal bone, both in absolute numbers and when compared to other excavated Anasazi rooms in the Mesa Verde area (Schelley 1986; Bradley 1986). The bone is in the form of unworked elements from several species and as partially worked fragments, probably representing stages in tool manufacture. The archaeologists familiar with the Wallace data have suggested that artisans at this community may have been engaged in the processing of animal byproducts (Shelley 1986). If so, the Lake View may represent a location where the system's demand for certain faunal resources was addressed. It would be logical to expect animal product specialization on the Northern Periphery, as targeted fauna (large herbivores, and the smaller complement of rodents, etc.) were probably more plentiful and easier to harvest here than in the vicinity of the Central Basin.

CONCLUSION

In this paper I have suggested that the Anasazi Northern Periphery was closely linked with the San Juan Basin during the second half of the 11th century and the succeeding 12th century. This linkage is seen as the expansion of the original small "Chaco" Anasazi economic and political system which was limited in its extent to the Basin until the last part of A.D. 1000's. The expansion was accomplished through establishment of new procurement outlier settlements on the northern frontier, and through "capture" or recruitment of existing local communities. It was done to correct certain resource supply and demand problems that became critical within the smaller original Basin system; specifically, these were the exhaustion of local timber stands and chronic shortages in local agricultural production, especially during warm periods. Expansion to the north would have solved both problems. Some of the implications of this model for archaeology on the Northern Periphery are as follows:

If Yucca House, Yellow Jacket, and Lancaster Ruin "captured" outliers and integral components of the regional economic and political system, then other large 12th century communities in the Plain would also have had close relationships with the system. Such relationships may have been as recruited or "captured" in-system members or as close foreign trading partners. The spatial extent of the system may have extended as far north as the Dolores River in Colorado and the Bug Point Ruin in southeast Utah.

It is obvious that there was a huge, well-organized population in the Plain, and that these groups would have had considerable influence on the dynamics of system economics and politics. Viewed from the standpoint of the regional economy, the Plains communities had the capability to produce large quantities of surplus agricultural goods that could supply the system in hard times. They also constituted a possible source of recruitable labor for the non-agrarian demands of the system.

Three possible outliers, Escalante Reservoir, Chimney Rock, and Lakeview, have been identified in this paper as communities that may have been established with a specific economic purpose in mind, although other secondary procurement and logistic demands may have been pursued. There may be additional resource procurement communities near the geographical periphery of the system in locations where important natural resources are common or at least accessible. Neumann Ruin, located in the Lost Canyon area southeast of Dolores, is a possible candidate. The presence of procurement outliers, if verified, has implications for the organization of the Anasazi regional system and its tremendous capacity for marshalling and expending labor and energy (Betancourt et al. 1986).

More specific test implications for the redistributive exchange and extractive community architectural models are easily derivable and could be used to design a field testing program with explicit data targets. Data objectives could be achieved through a research program incorporating remote sensing, limited survey and excavation, site mapping, and directed environmental studies. One thing is certain: archaeologists will not be able to address change and process in the prehistoric northern Southwest until the true extent of the Anasazi system and its internal and external relationships are better understood.

Bonito Style Community Structures: Chimney Rock Pueblo In Regional Context

John R. Roney[1]

Abstract — Chimney Rock Pueblo may have been a special function structure providing both local and regional integration in a manner similar to that of other Bonito style community centers throughout the Chaco culture area. The public, Bonito style architecture at Chimney Rock suggests that the community was involved in a formal system of regional integration.

In this paper, I argue that Chimney Rock Pueblo is a special function building which served as a focus of local, village-level integration. This argument is based upon the observation that Chimney Rock Pueblo and its associated community are but one example of a pattern of architecture and community layout which has considerable temporal depth and spatial extent. Community patterns resembling those observed at Chimney Rock Pueblo go back at least as far as Basketmaker III times. Buildings which closely resemble Chimney Rock in architectural detail and in their location within a larger community are found at least as far south as Quemado, New Mexico, and as far west as the Hopi Indian Reservation in Arizona (Lekson et al. 1988). Any attempt to explain Chimney Rock must take into account the broad scale of this more general phenomenon.

Chimney Rock Pueblo is an example of the Bonito architectural style (Marshall et al. 1982). The Bonito style was originally defined to encompass a wide range of architectural features, but in this paper I use the term with specific reference to large and distinctive buildings found near the center of many prehistoric communities. Although the roots of this style reach back to Basketmaker times, its use in community centers is most widespread between A.D. 1050 and 1130. During this brief interval, numerous examples of Bonito style buildings were built over much of the Colorado Plateau. The largest examples of this style are the Great Houses of Chaco Canyon, but most Bonito style buildings are much smaller. Although some of the more impressive Bonito style buildings in southwestern Colorado and southeastern Utah have been noted (e.g., Chimney Rock, Escalante, Wallace, Ida Jean, Lowry, Cottonwood Falls) it is likely that other less impressive examples will be recognized in the years to come. Many of the attributes which define Bonito style community centers during Late Pueblo II times are shown schematically in Figure 1 (Marshall et al. 1979; Powers et al. 983; Fowler et al. 1987).

One central aspect of these buildings is the blocked-in kiva, a surface (rather than subterranean) kiva built into a large rectangular room. Outside of the Chimney Rock area, almost every late Pueblo II building with a blocked-in surface kiva also exhibits many other Bonito style attributes. The kiva is complemented by a series of unusually large rooms. These rooms are as much as three times the size of rooms in contemporaneous residential buildings. Massive coreveneer masonry was used in the construction of these buildings. Because of this, when Bonito style buildings collapse they produce a rubble mound which is usually much larger than rubble mounds left by ordinary dwellings. In many cases the Bonito style buildings include a second story, and they are among the earliest Anasazi buildings to do so. They sometimes have a formal plaza in front of the building, defined by a low wall. Bonito style buildings often have aureolas, which are road-like swales encircling the base of the building. Prehistoric roads are closely associated with these buildings and the berms of the roads are often exaggerated into artificial mounds called earthworks. The earthworks are usually found in immediate proximity to the Bonito style buildings and are essentially small platform mounds (Lekson 1984; Toll 1985). If a great kiva is present, it is almost always closely associated with the Bonito style building. Bonito style buildings are often built on prominent landforms near the center of their associated community. Bonito style buildings in the Greater San Juan Basin are easily distinguished from other buildings within their

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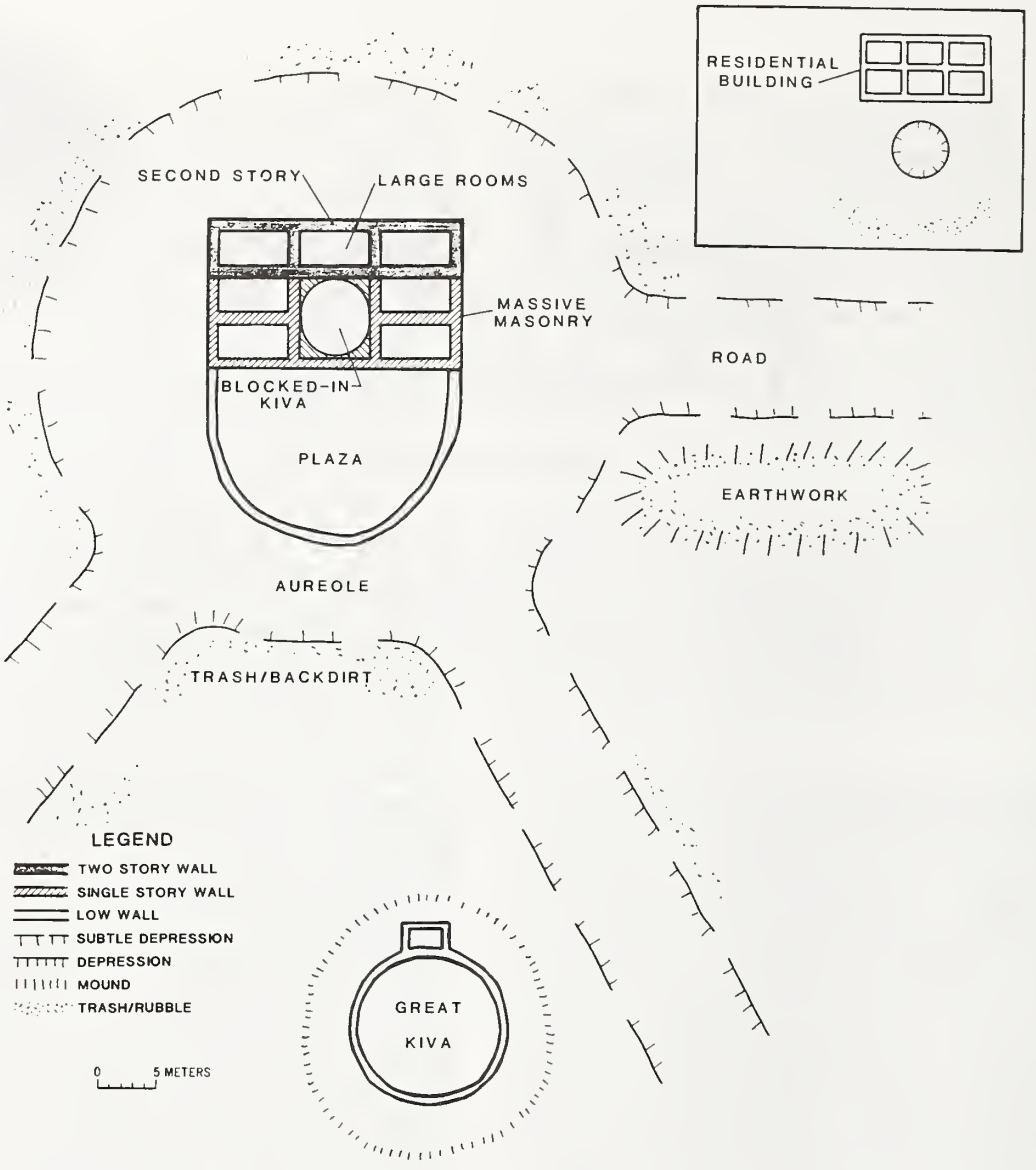

Figure 1.—Schematic illustration of the principal architectural characteristics of Bonito Style Community Centers.

respective communities on the basis of these characteristics. Although not all attributes are present in all buildings, all Bonito style buildings do combine a number of these characteristics.

Several arguments suggest that Bonito style buildings served important non-domestic functions, and that residential use of these buildings during late Pueblo II times may have been limited (see Marshall et al. 1979; Windes 1984; Toll 1985). Bonito style buildings contrast with normal residential buildings in many ways. First, the architectural style is defined by a suite of features which do not have analogues in ordinary residential sites. These include the roadways, aureolas, and earthworks. These features imply functions which lie outside the realm of ordinary domestic activities.

The large room size also implies special functions. Both before and after the A.D. 1050 to 1150 interval, ordinary residential rooms included six to nine square meters of floor space. In contrast, rooms in Bonito style buildings depart consistently from this norm, usually having rooms 16 square meters or more in size (Marshall et al. 1979). Where walls are still standing, it is clear that ceiling heights were also unusually high in Bonito style buildings. This marked difference in room size implies that space was being used differently in Bonito and non-Bonito style buildings.

Differences in the distribution of trash and domestic features also suggest that Bonito style buildings served special functions (Marshall et al. 1979; Toll 1985). Ordinary residential buildings include numerous domestic features and contain trash in a variety of contexts. On the other hand, almost every Bonito style building which has been excavated has consisted of large, empty rooms generally lacking domestic features and trash (at least for their initial A.D. 1050 to 1150 occupation). Moreover, both human burials and faunal evidence of dogs are largely absent in Bonito style buildings. Toll (1985) points out that both are common in ordinary residential sites and argues that their absence in Bonito style buildings further suggests special, nonresidential functions for these buildings.

The nature of additions to these buildings also indicates that they were not normal residences. Many residential buildings evidence growth by accretion, as space requirements of the inhabitants changed. However, growth by accretion seldom occurred at the Bonito style buildings. Instead they were built according to a preplanned layout. Remodeling of these buildings during the A.D. 1050 to 1150 interval usually involved reconstruction according to an updated plan, rather than the expedient addition of new rooms. This implies that the space requirements of these buildings were fixed and that expansion occurred in large increments with considerable attention to the overall exterior appearance of the building. This is not the pattern which would be expected if additions were made in response to a growing population of inhabitants.

A final point concerns the distribution of Bonito style buildings. If these structures were built for residential purposes by migrants, we would not necessarily expect to find only one intrusive structure in each indigenous community. Neither would we expect that virtually every indigenous community would include a Bonito style building. However, with very few exceptions there is only one of these buildings in each community and almost every substantial grouping of residential sites over vast, contiguous areas of the Colorado Plateau includes a Bonito style building. Moreover, these buildings are almost never found in the absence of an associated indigenous community. It is difficult to account for these observations in the context of a residential interpretation.

These arguments do not demonstrate that residential activities never took place in the Bonito style buildings. However, it does seem clear that much of the space in Bonito style buildings and many of their exterior features were nonresidential in nature, and that the activities supported by this architecture took place in the context of local, indigenous communities.

COMMUNITY PATTERN

In order to explore the function of Bonito style buildings it is necessary to consider their position in relation to their contemporaneous communities. A basic community pattern consisting of residential buildings grouped around a local integrative structure becomes clear by Basketmaker III times (Doyel et al. 1984). Within the greater San Juan Basin, Basketmaker III remains are widely distributed in a variety of environmental settings. Individual pithouses which undoubtedly housed single nuclear or extended families were the basic unit of residence during this period. However, we know of numerous examples of relatively tight groupings of pithouses associated with a great kiva. This pattern has been best described at Shabik'eshchee Village in Chaco Canyon (Roberts 1929; Wills and Windes 1989), but it is also documented at sites such as Tohatchi Flats (Peckham cited in Marshall et al. 1979) and Broken Flute Cave (Morris 1980). The role of great kivas as foci of local integrative functions has been accepted for a number of years (Haury 1950; Hawley 1950; Adler 1989; Adler and Wilshusen 1990). These subterranean buildings housed activities which bound individual families into larger, village-level social units.

This community pattern continued into Pueblo I times, when great kivas are associated with aggregated communities such as Grass Mesa Village (Lightfoot 1988; Lightfoot et al. 1988) and House Creek Village (Nelson and Kane 1986), as well as with more dispersed communities such as Casa Patricio (Stein 1983) and San Mateo Mesa (Marshall et al. 1979). In the Navajo Reservoir District immediately south of Chimney Rock, this community pattern is illustrated at Sandoval, Sambrito, and Bancos Villages (Eddy 1966). During early Pueblo II times great kivas are also characteristic of a number of dispersed communities. As in earlier times, this community pattern is taken to reflect individual family units integrated into village level organizations with great kivas as foci of local integration.

Although some early Bonito style structures were built prior to A.D. 1050 (Windes and Ford 1990), there was a startling increase in their numbers between A.D. 1050 and 1130. During this brief interval, great kivas were either supplemented or completely replaced by surface structures built in the Bonito architectural style throughout the Greater San Juan Basin. In the Red Mesa Valley, older great kivas were abandoned and new, somewhat smaller great kivas with a nearby Bonito style structure were built within the larger community (M. Marshall, personal communication 1988). In the Chusca Valley, residential buildings are grouped around Bonito style buildings which include great kivas in their plazas. There are a number of examples of Bonito style buildings which are linked to great kivas by roads (Padilla Well, Kin Hochoi'i, Coolidge). In the entire Greater San Juan Basin, only two or three examples are known during this time period of great kivas which are not clearly associated with a nearby Bonito style building (Vidal Site, Jackson Lake, and perhaps Ft. Wingate). On the other hand, many communities occupied between A.D. 1050 and 1130 include a Bonito style building near their center instead of a great kiva (Marshall et al. 1979; Powers et al. 1983).

These observations leave little doubt that Bonito style buildings are intimately associated with great kivas. If great kivas housed activities which facilitated local integration, then it seems very likely that Bonito style buildings were also intimately involved in these activities.

REGIONAL INTEGRATION

Even as early as Basketmaker III times, it is likely that there was at least loose region-wide integration in the Anasazi culture area. The extensive distribution of relatively homogeneous ceramic styles indicates widespread integration by common belief systems (Toll 1985) or even participation in a regional social network with strong economic overtones, as Plog (1980) has suggested. Specific similarities in both domestic architecture and public architecture (great kivas) reinforce the notion that

local Basketmaker III communities were at least loosely integrated into a larger regional economic, social, and/or religious system.

During Pueblo I and early Pueblo II times, the widespread distribution of ceramic styles such as the Red Mesa or Kana's style continues to suggest broad regional integration. It was during this time that Chaco Canyon began to emerge as a distinctive regional center. This is indicated by the beginnings of large-scale Bonito style construction, and may signal the formalization and intensification of the mechanisms which united disparate communities into a regional economic, social, political, and/or religious system.

By late Pueblo II times, three separate data sets suggest strong, relatively formal regional integration with a central focus in Chaco Canyon. First, over most of the Colorado Plateau there was an abrupt and apparently synchronous shift from Red Mesa style ceramic designs to the hatched and solid style decorations associated with Gallup and Escavada Black-on-white and their analogous regional types (Toll 1985).

Second, the use of a remarkably homogeneous set of architectural characteristics in the construction of local integrative structures also suggests that these communities participated in a regional integrative system. In their day, the Bonito style buildings were the most impressive cultural features on the Southwestern landscape. Their rigid conformance to regional architectural conventions underscores the importance which their builders placed upon linkages with other like-minded communities.

The third data set which implies regional integration consists of prehistoric roads, which connected some of the community centers to one another and to Chaco Canyon. Although all prehistoric roads may not have been part of an integrated network (Roney 1990b), at least some clearly do provide a tangible, physical link between certain Bonito style structures and between these buildings and Chaco Canyon.

Under this interpretation, many of the Bonito style buildings in Chaco Canyon may have served regional, rather than local, integrative functions. Just as smaller, village-level Bonito style buildings housed activities which bound individual families into cohesive local communities, the concentration of large-scale Bonito style buildings in Chaco Canyon was built to host activities which united local communities into a larger, region-wide system of integration.

At this time, we know very little about the role and workings of the regional integrative system. To me it seems likely that communities chose to participate in such a system in order to receive real or perceived benefits. Toll (1985) and Judge (1984) have suggested one possible model for a regional system based upon mutual benefit and obligation. They propose that Chaco Canyon may have hosted annual ritual pilgrimages which provided a context in which regional economic exchange and coordination could occur.

Their suggestions are based at least in part on ethnographic analogy, an avenue of research which I hope will be increasingly pursued in the future. Archaeological evidence is providing relatively accurate and detailed information about the scale of the regional system, the size of the units which comprised it, and the population and subsistence base upon which it rested. These reconstructions should allow us to seek out appropriate ethnographic analogues. Although many details of the workings of the regional system may never be understood, there should be broad cross-cultural regularities in the general nature of such systems and in the factors which motivated their participants.

CHIMNEY ROCK

Chimney Rock Pueblo conforms closely to the pattern described above for Bonito style community structures. It has two blocked-in kivas, complemented by unusually large rooms and a well-defined plaza (Eddy 1977). It is constructed of massive, coreveneer masonry, and it occupies the most prominent landform within its associated community. It is associated with a great kiva and an entire series of contemporaneous residential buildings. Rather than growing through accretion, Chimney Rock Pueblo was built as a single, large construction conforming to a master design (Eddy 1977).

The community which is associated with Chimney Rock Pueblo has been described by Eddy (1977) as the "Chimney Rock District." It includes at least 26 separate buildings with a combined total of 219 rooms, distributed over an area which is 4 or 5 km in diameter. This is comparable in size to other documented local communities which have Bonito style community centers (Dykeman 1982; Harper et al. 1988). Both residential architecture and ceramics in the Chimney Rock community are local in character.

Under the model outlined in this paper, Chimney Rock Pueblo is interpreted as a local integrative structure. It was built by a local population to support activities which bound people together into a cohesive community. Their choice of Bonito style architecture in the construction of this building indicates participation in a broad system of regional integration centered in Chaco Canyon. The nature of the relationship between this local community and the larger, regional level of organization is an important issue for future research.

The position of Chimney Rock in this scheme is especially interesting because Chimney Rock was established in an area which was not a mainstream participant in the regional system which encompassed the Greater San Juan Basin. The Chimney Rock Phase developed from the distinctive Rosa and Piedra Phases. Ceramic and architectural evidence linking these phases closely with contemporaneous developments in nearby regions is relatively weak. These observations also hold for the Chimney Rock Phase, as evidenced by the unusual residential architecture and by somewhat anomalous local ceramics. Despite these differences, the public architecture at Chimney Rock shows conclusively that it participated in a broad pattern which seems to imply formal regional integration.

Chimney Rock and Chaco Canyon: A Critical Re-examination of the Outlier Concept

Gordon C. Tucker Jr. [1]

Abstract — Chimney Rock may have functioned as a Chacoan port-of-trade with a religious component constructed by a local elite rather than a Chaco elite. The development of the community proceeded over two centuries in response to natural and cultural forces, and only late in its life does it appear to have established trading relationships with Chaco Canyon.

Chimney Rock Pueblo may perhaps be best understood as a local cultural response to changing environmental conditions (Tucker 1981). That is, it may represent the zenith of an indigenous social system that had evolved gradually in response to variable environmental conditions. The architectural similarities of Chimney Rock Pueblo with other Chacoan sites could be explained as the result of two competing hypotheses: (1) it represented an attempt by local elite to strengthen their social position by emulating a successful cultural adaptation, or (2) it represented a site unit intrusion by Chacoan colonists, possibly male religious elite or priests driven out of Chaco by internal social upheaval. Several propositions were formulated to test the validity of each hypothesis, but the results were ambiguous. Some propositions were confirmed and some unconfirmed. Neither hypothesis could be conclusively validated.

This paper explores the nature of the connection between Chimney Rock and Chaco. I critically examine the concept of a Chacoan Outlier and analyze the validity of its application to Chimney Rock Pueblo. I think it is appropriate this problem be examined from the Chimney Rock perspective, since most of the extant research on the topic has a decided Chacoan bias. My objective is to clarify further the following issues: Is Chimney Rock Pueblo a Chacoan Outlier? If so, then why and how did it originate, what was the nature of the relationship, and why did it end? If it is concluded that Chimney Rock Pueblo is not an outlier, then we must explain the architectural similarities with Chacoan structures.

CHACOAN OUTLIER

The concept, if not the name, of Chacoan Outlier has a long history in the region. As we have already seen, a cultural connection between Chimney Rock and Chaco was recognized almost 70 years ago by J.A. Jeancon and Frank H.H. Roberts Jr. Until recently, no one has stated precisely the nature of this connection and what it might portend for a better understanding of the regional prehistory. The publication in 1983 of *The Outlier Survey* (Powers et al. 1983) was a major step forward because it greatly clarified and refined the concept of a Chacoan Outlier.

In simplest terms, a Chacoan Outlier is a site that is "physically separated from Chaco Canyon, yet exhibiting Chacoan masonry, Chacoan ceramics, great kivas or tower kivas, and connected to Chaco by means of a roadway and visual communication system" (Judge 1979). Powers et al. (1983) expand upon this definition by their examination of several dozen so-called outlier sites and communities in the San Juan Basin of southwestern Colorado and northwestern New Mexico. Within this region, they define several cultural subareas, which are linked to Chaco Canyon (a subarea itself) by a major road system. Each subarea contains one or more communities, each community representing "an aggregation of contemporaneous sites occurring within a small, circumscribed area, with a site density exceeding that of surrounding areas" (Powers et al. 1983). Each community includes all of some of the following

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site types: Chacoan structures, small houses, great kivas, and a variety of limited-use sites. The diagnostic morphological attributes of each site type are described in Table 1. After examining the characteristics of numerous outlier communities, Powers et al. (1983) provide quantitative data on the morphological attributes of Chacoan structures and small house sites; Table 2 summarizes their results.

Table 1.—Diagnostic and morphological attributes of Chacoan Outlier community site types.

Site Type	Diagnostic Morphological Attributes
Chacoan Structure	1. Relative large size 2. Large-scale structure planning 3. Core and veneer walls 4. Chaco style masonry 5. Large rooms, high ceilings, and use of large conifer timbers for roofing 6. Chacoan kiva furnishings
Small House Site	1. Relatively small size 2. Small-scale structure planning 3. Simple and compound masonry 4. Small rooms and low ceilings 5. Simple kiva furnishings
Fieldhouses	1. Few rooms 2. No kivas 3. Near arable land 4. Used seasonally
Great Kivas	1. Large, circular subterranean or semi-subterranean structure 2. Used for ceremonial purposes
Limited Use Site	1. Surface artifact (lithic or ceramic) scatter 2. No architectural features

Powers et al. (1983:15-18)

Table 2.—Summary of outlier site type variability and morphology.

Attribute	Site Type	Variability No.	Range	Mean	Std. Dev.
Site Size (sq. m.)	Chacoan Structures	4	15,010-23,395	17,991	3,964
	-large sites	7	5,935- 8,990	8,072	999
	-medium sites	40	145- 3,552	1,172	955
	-small sites	51	145-23,395	3,438	5,083
	Small House Sites	141	18-680	179	140
Structure Planning	Chacoan Structures				
	-present	18 (35%)	-	-	-
	-absent	5 (10%)	-	-	-
	-indeterminate	28 (55%)	-	-	-
No. Rooms	Chacoan Structures				
	-large sites	4	215-695	474	182
	-medium sites	7	130-290	181	54
	-small sites	40	1-190	41	38
	-all sites	51	1-695	94	137
	Small House Sites	140	1-45	10.2	7.3
Core and Veneer Walls	Chacoan Structures				
	-present	42 (82%)	-	-	-
	-absent	4 (8%)	-	-	-
	-indeterminate	28 (55%)	-	-	-
Room Size (sq. m.)	Chacoan Structures	41	4-25	12.6	5.4
	Small House Sites (BC 50-51)	39	-	9.0	-
Ceiling (m)	Chacoan Structures	16	1.5-4.0	2.4	0.5
Mound Height (m)	Small House Sites	127	0.25-2.50	0.9	0.6
Roofing Materials	Chacoan Structures				
	-large conifers	912 (75%)	-	-	-
	-small conifers or non-conifers	312 (25%)	-	-	-

Data from Powers et al. (1983)

As these data demonstrate, "Chacoan structures are physically distinct from small houses with correspondingly distinct social roles and functions. Further, differences between Chacoan structures suggest distinctive, perhaps hierarchical, roles and functions" (Powers et al. 1983). The latter observation refers to the clustering of Chacoan structures into three size groups: large, medium, and small. The reality of this tri-partite division is readily apparent in Table 2. Powers et al. (1983) suggest that the small sites were low-level administrative centers for their attendant communities, while the medium and large sites functioned as administrative centers for major road systems and their communities, as well as the entire Chacoan system. Following Morris (1928, 1939), they suggest each of the 11 large and medium Chacoan structures be labeled a greathouse (Powers et al. 1983).

SUMMARY OF CHACO AND ITS OUTLIERS

The preceding discussion has summarized what is presently understood about the Chaco system and Chacoan Outliers. By about A.D. 850, a distinct division between site types in Chaco Canyon became apparent: towns vs. villages. The towns are large multi-room pueblos, constructed according to a plan, containing luxury items, and associated with a complement of unplanned villages, roads, and water-control features. The villages, in contrast, are smaller and contain structures which were not built according to a pre-conceived plan, with fewer rooms and kivas. This distinction is evidence of a developing social hierarchy, with elite members of the society occupying the towns and common folk living in the villages. The towns in Chaco Canyon are positioned at the nucleus of a regional redistribution and visual communication system. The outlier communities supplied basic resources (e.g., food, timbers, animal by-products, and ceramic and lithic materials) to Chaco Canyon and presumably received luxury or prestige items (e.g., turquoise, finished ceramics, shell, and feathers) in exchange. This sophisticated exchange system collapsed in the mid-1100's due to environmental deterioration.

THE EVIDENCE FOR AND AGAINST CHACOAN INFLUENCE AT CHIMNEY ROCK

Having summarized the archaeological manifestations found on Chimney Rock Mesa and defined the concept of a Chacoan Outlier, we may now turn to the question of whether or not Chimney Rock is, in fact, such an outlier.

The Chimney Rock Pueblo (5AA83) exhibits several morphological attributes which identify it as a Chacoan structure: planned construction, core and veneer walls, Chaco style masonry, and two Chacoan kivas. The estimated size of the structures (2,535 m^2) places it in the small size group of

Chacoan structures (Powers et al. 1983:Table 41). It is incorporated within a community (the High Mesa Group) of 13 small house sites (with a total of 74 rooms), at least 2 great kivas, and 2 limited use sites. Its period of use, from ca. A.D. 1076 to A.D. 1125, corresponds closely to that period (i.e., the Classic Bonito Phase) when the Chaco system had matured into a regionally pervasive, complex, and formalized trade network (Judge 1979). The date of abandonment (A.D. 1125) coincides with the last major period of building activity in Chaco Canyon during the late 1120's (Judge 1979), which signaled the beginning of the end for the Chaco phenomenon.

It is also true, however, that the Chimney Rock Pueblo differs in small but significant ways from other Chacoan structures. First, it is not associated with any road: the closest Chacoan Outlier near a road is Salmon Ruin, located on the San Juan River at the terminus of the Great North Road, about 90 km downstream from Chimney Rock Mesa. Second, it contains very little trade pottery: only 1.7% of the recovered shards have been identified as ware that are commonly associated with Chaco (i.e., Cibolan and Tusayan) (Eddy 1977). Third, few exotic artifacts (i.e., of non-local origins), with the exception of some turquoise and obsidian, have been found in the excavated rooms. The turquoise artifacts include several pieces found in the West Kiva, a portion of a pendant and a piece of inlay from Room 1a, and a pendant and several pieces from Room 35. A few flakes of obsidian were also recovered by the excavations. Finally, if the site was built and used by male religious elite from Chaco, would not one expect to find at least some of these individuals buried on or near the site? It is true, however, that not all of the ruin has been excavated, and such high status burials may eventually be located in these unexcavated areas. Some other oddities appear when one closely examines the composition of the High Mesa community.

If a pattern exists throughout the Chaco system in the morphological attributes of the small house sites that make up each Chacoan Outlier community, then we would expect that the attributes of the sites in the High Mesa community would match those of other small house sites in the system. In fact, they do not. For at least two critical variables, estimated site area and estimated number of rooms (Table 3), the High Mesa community differs markedly from other small house sites (compare with Table 2). The High Mesa community sites are, on the average, nearly 20 times larger than the other small house sites, but they have only about half as many rooms. The variability is very high when all sites are considered; however, when the sites are segregated by site area into three classes, the variation diminishes: for large sites (2,284-19,044 m^2), the mean site area is 8,469 m_2 and the standard deviation is 6,125 m^2; for medium sites (250-480 m^2), the mean site area is 342 m^2 and standard deviation is 92 m^2; for small sites (5-42.7 m^2), the mean site area is 25 m^2 and the standard deviation is 16 m^2.

Although the Chimney Rock High Mesa community is similar to other outlier communities in some respects, it is different in several other attributes. How does one account for the discrepancies? Do the differences nestle within the expected

Table 3. – Selected morphological attributes of sites from the High Mesa Group.

Site Number	Estimated Site Area (sq. m.)	Estimated Number of Rooms
5AA84	42.7	1
5AA85	424.8	9
5AA86	3,250.0	8
5AA87	2,284.2	6
5AA88	19,044.0	16
5AA89	28.1	2
5AA90	5.0	1
5AA92	11,108.9	15
5AA93	6,660.0	6
5AA94	480.0	3
5AA95	278.9	3
5AA96	278.9	2
5AA102	249.6	1
Mean	3,395.0	5.6
Std. Dev.	5,526.2	4.9

Data from Eddy (1977)

range of variation, or do they signify some important cultural differences? Stated somewhat differently, but more to the point: Is Chimney Rock Pueblo and the High Mesa community a true Chacoan Outlier community, or is it a local phenomenon with a thin veneer of extra-local traits? I suspect that the latter explanation is more correct for the following reasons. The eight prehistoric communities found in the Chimney Rock area represent the physical manifestations of a settlement hierarchy, which evolved gradually over a period of about two centuries. The principal site types in each community are the great kiva and the residential unit. The structures in the communities near the Piedra River and Stollsteimer Creek are somewhat different from those found further up the mesa, but they represent an adaptation to a slightly different ecozone and nodes in a network of social and economic interchange. The perceived patterns are consistent with the variability expressed by a viable social grouping, which was evolving and adapting to changing environmental and social conditions.

The Chimney Rock Pueblo is an anomaly in this evolutionary scheme, however. It is so different from any other structure in the area, that it is quite understandable that it has been explained as a site-unit intrusion of extra-local colonists. Why else would this structure look Chacoan if actual Chacoan immigrants had not constructed it, or at least supervised its construction? It is also reasonable to assume that because of the possible ceremonial function of the Chimney Rock Pueblo, its builders (or construction overseers) were male religious elites, or priests. If these suppositions are correct, where is the physical evidence of such an elite class, such as high status burials, trade pottery, and luxury items? To repeat a statement made earlier, just because it looks Chacoan, does it necessarily follow that it is Chacoan?

I believe that the Chimney Rock Pueblo was constructed by local elite, who modeled its form after similarly impressive buildings in Chaco Canyon. These local elite may actually have lived in one or more of the surrounding residential units and used the Chimney Rock Pueblo for ceremonial purposes. Contact between Chimney Rock and Chaco Canyon must undoubtedly have occurred, but evidence of an actual site-unit intrusion by Chacoan colonists is slim.

ITEMS AND ROUTES OF EXCHANGE

Several other important aspects of a regional exchange network are conveniently ignored when the question arises of whether or not Chimney Rock Pueblo is a Chacoan Outlier: what kinds of items were moving through this network and where are the routes of exchange? A brief examination of these questions may clarify the problem.

Examples of exchange systems abound in the ethnographic and ethnohistoric literature, such phenomena occurring in widespread geographic localities, from Australia to North America (cf. several references cited in Tucker 1979). Its appearance is generally related to the localization of various vital (culturally defined) resources. Several studies (e.g., Adams 1966; Arnold 1975; Renfrew 1969; Tortellot and Sabloff 1972) have shown that these exchange systems have played significant roles in the evolution of ranked and state societies, and demonstrated convincingly that the nature of traded items will vary according to distance. That is, local intra-community exchange is characterized by utilitarian or subsistence artifacts, while long-distance trade is concerned primarily with prestige artifacts, raw materials, and finished craft items.

Some researchers have observed, in fact, that these prestige items or "highly valuable objects" may be exchanged to enhance the social status of a local leader so that he may act effectively as an "economic manager" in maintaining the exchange system (Harding 1967). In his study of a Mesoamerican exchange system, Kent Flannery outlines concisely the nature of the relationship between the suppliers and consumers of various "exotic" raw materials. His observations are pertinent to this discussion and merit a lengthy quote.

First, it seems that the upper echelon of each society often provides the entrepreneurs who facilitate the exchange. Second, the exchange is not "trade" in the sense that we use the term, but rather is set up through mechanisms of ritual visits, exchange of wives, "adoption" of members of one group by another, and so on. Third, there may be an attempt on the part of the elite or of the less sophisticated society to adopt the behavior, status trappings, religion, symbolism, or even language of the more sophisticated group--in short, to absorb some of their charisma. Fourth, although the exchange system does not alter the basic subsistence pattern of either group, it may not be totally unrelated to subsistence. It may, for example, be a way of establishing reciprocal obligations between a group with an insecure food supply and one with a perennial surplus (Flannery 1968).

Thus, if Chaco Canyon and Chimney Rock Pueblo participated in a regional system of exchange, what items flowed through this system? Recent studies of the Chacoan system have demonstrated convincingly that Chaco Canyon was and is a resource-poor environment, which could not have supported the large populations that inhabited its many sites (Powers et al. 1983). It was supported economically by the outlier communities, most of which were located in environments with ample resources. Chimney Rock Mesa is such an environment, and the surrounding region could have supplied many items for use and consumption by the Chacoans: timbers for structures, animal products (jerked meat, antlers, teeth, hoofs, and bones), agricultural foodstuffs, wild plants, and lithic or ceramic raw materials (Powers et al. 1983; Tucker 1981).

But, what material goods or benefits did the Chimney Rock residents acquire from this exchange system? In a word--prestige. They probably received items of a prestigious nature, such as turquoise and obsidian, from Chaco Canyon. There is ample evidence that Chaco residents actively exploited the turquoise deposits found near Cerrilos, New Mexico, about 180 km east of Chaco Canyon, and participated in a regional turquoise trade network (Weigand, Harbottle, and Sayre 1977). Obsidian could easily have been obtained from sources near Jemez, New Mexico, located about 120 km east of Chaco Canyon. Pieces of turquoise from inlays and turquoise pendants, as well as obsidian flakes, have been found at the Chimney Rock Pueblo (Tucker 1981). Possession of these items by the elite members of the Chimney Rock communities would have enhanced their prestige and social ranking, and they undoubtedly went to great lengths to maintain and further this "Chacoan Connection." It seems unlikely, however, that this exchange system would have evolved if an elite class had not already been established at Chimney Rock prior to any contact with Chaco. In other words, the Chacoan Connection merely strengthened and sanctioned an already existing stratified social system. By about A.D. 1125, environmental conditions at Chimney Rock had deteriorated to the point that wholesale abandonment occurred. This local event produced a "ripple effect," which eventually resulted in the complete disruption of the Chaco system by A.D. 1150.

Finally, we must consider where the routes of exchange between Chimney Rock and Chaco Canyon might lie. A quick inspection of the regional geography suggests immediately that such a route must be riverine; i.e., down the Piedra and San Juan Rivers to the Salmon or Aztec Ruins and then on to Chaco via the Great North Road. Research conducted at Chacoan sites, associated with identified roads, has determined that "the sites between Aztec and Chimney Rock probably would be spaced about 10-20 km apart" and that at least 2 substantial outliers the size of Chimney Rock Pueblo would exist along the route, in addition to two or three smaller intermediary "way stations or signaling points." (Robert P. Powers, personal communication 1979).

Because this postulated exchange route lies within that area studied for the Navajo Reservoir Project, it is reasonable to suppose that these sites have been found. Unfortunately, such specialized localities were not identified by this major salvage project. Further complicating this proposed scenario is the fact that no late Pueblo II sites (i.e., coincident with the late Chimney Rock Phase) exist in the lower reaches of the Navajo Reservoir (Frank W. Eddy, personal communication 1981). It is equally possible that prehistoric travelers leaving Aztec or Salmon for

Chimney Rock may have followed any of the other major regional drainages (e.g., the Animas or Pine Rivers) to a convenient spot and then continued eastward along an overland route (Frank W. Eddy, personal communication 1981).

I am forced to conclude that the postulated intermediary sites along the riverine exchange (1) no longer exist (they are buried by alluvial sediments or were washed away), (2) they never existed (it was a "straight shot run" from Aztec or Salmon to Chimney Rock with no stops along the way), or (3) the exchange route itself does not exist. Insufficient data precludes a clear-cut solution to this problem, but the first possibility is more likely, given what we do know.

CHIMNEY ROCK AND PUEBLO: AN ALTERNATIVE EXPLANATION

With all this information in mind, what can we conclude about the role, if any, Chimney Rock Pueblo and the other communities on Chimney Rock Mesa may have played in this postulated regional exchange system? In order to answer this question, I believe that we must look farther afield to other geographical localities that exhibit evidence of contact between two archaeological cultures. Obviously, one could probably look at any area of the world and find many examples of such contact. For this discussion, however, I have chosen just one example, one which has been well-studied and which evidences some similarity to the Chaco-Chimney Rock situation. I refer to Teotihuacan, the large, urban center located in the Valley of Mexico, and the influence it had upon, and control over, the population existing in the Valley of Guatemala during the Middle Classic period (A.D. 400-600). The 2 locations are approximately 1,100 km apart.

Kenneth L. Brown (1977) examined this problem in some detail. He proposed and tested two competing models that attempt to define the nature of the contact between Teotihuacan and the Valley of Guatemala: the conquest model and the port-of-trade model. The conquest model asserts that Teotihuacan's influence and/or control over Kaminaljuyu and other sites in the Valley of Guatemala was achieved by a direct political takeover (Brown 1977). The process of conquest may have been gradual: trade preceded tribute (Brown 1977). Initial contact and establishment of a trading relationship was eventually followed by military conquest. The degree to which native practices were altered or eliminated reflects the level of control exercised by the foreign rulers (Brown 1977).

Brown (1977) proposed four major consequences of the conquest model, each of which has one or more test implications. Table 4 summarizes these expectations. He found that the archaeological record from sites in the Valley of Guatemala does not contain data that would support the hypothesis of a conquest of the area by Teotihuacanos. He explains further:

At present signs of conflict, including advanced weapon systems, appear to be missing. The distribution of architecture and artifacts and the settlement pattern suggest widespread external influences on the evolution of the political and economic systems within the valley, but they do not argue for an external "control" of this evolution (Brown 1977).

Table 4.—Tree-ring dates from the first building episode, Wallace Ruin.

Conquest Model	Port-of-Trade Model
1. Signs of Conflict	1. Environmentally Transitional Area
A. Signs of destruction	A. Natural environment
B. Weapons	B. Cultural environment
C. Garrisons	2. Politically Weak Area
D. Defensive locations of major sites	3. Local and Long-distance Trade Separated
2. Distribution of Foreign Artifacts & Architecture	A. Internal economic activity center(s)
A. Presence of foreign elements at political capitals	B. Spatially separated long-distance trading activity center(s)
B. Discontinuity in native artifacts	4. Trade in Elite Items Only as an Affair of State
C. Disruption of trade	A. Items for elite consumption
D. Single architectural style in major centers	B. Associates workshop areas
3. Valley Settlement Patterns	5. Strict Enforcement of Codes of Behavior
A. Discontinuity in growth and patterning	A. Non-interference in native politics
B. Relocation of native population	B. Control of surplus labor
C. Primary and secondary centers	C. Non-interference with native religion
4. Burial Patterns	D. Non-interference with native economic system
A. Reflect those of conquering group	E. Isolation from native population
	6. Formal Trade Treaties
	A. Stability of port functions
	B. Control over trade transactions
	7. Religious Sanctions on Trade
	A. Presence of foreign religious structures
	B. Spatial restriction of foreign religious paraphernalia
	C. Presence of native religious paraphernalia
	8. Enclaves of Foreign Traders
	A. Resident foreigners
	B. No homeland wives and families
	9. Trading Loci
	A. One large site, or
	B. Several smaller sites

Data from Brown (1977)

The port-of-trade model differs markedly from the conquest model. A port-of-trade is broadly defined as a geopolitical unit in which trade was an affair of state, and its administration was embedded in the social context (Brown 1977). Nine characteristics of a classic port-of-trade are listed in Table 4. Evidence for all nine characteristics were found in the archaeological record of sites in the Valley of Guatemala, and Brown (1977) concluded that "...the Valley of Guatemala could have functioned as a port-of-trade during the Middle Classic."

Chaco Canyon and Chimney Rock Mesa are many kilometers removed from Teotihuacan, Kaminalujuyu, and the Valley of Guatemala, and they never achieved the same level of organizational complexity that the Mesoamerican localities did. Yet the relationship between the two trading partners (Chaco-Chimney Rock and Teotihuacan-Valley of Guatemala) is similar enough that an application of the conquest and port-of-trade models is not unwarranted and may have some heuristic value.

If the conquest model were valid, Chaco would have attained hegemony over the Chimney Rock community through first a trading relationship, but then assumed direct control over the political and economic apparatus of the native society. Evidence for such a conquest is completely lacking at Chimney Rock, however. First, there are no signs of conflict, as Eddy (1977) has noted. Second, except for the Chimney Rock Pueblo, which was built according to a distinctive Chaco style, the cultural materials (artifacts and architecture) found at all the sites on

Chimney Rock Mesa are generally of local design and manufacture. The only exceptions to this pattern are a few non-local ceramics (e.g., Cibolan and Tusayan wares), some turquoise and obsidian artifacts, and 11 ceramic feather holders. The latter are most interesting since they are interpreted to have a ceremonial function. Two of these feather holders were found in the roof fall of Room 8 at Chimney Rock Pueblo, but the remainder came from residential structures at the Ravine Site (four holders), the Access Road site (three holders), and site 5AA85 in the High Mesa community. Mary Sullivan (1990) has found that the chemical composition of the clays in four Chimney Rock feather holders (the two from Chimney Rock Pueblo and two from the Access road site) matched that of the holder from Pueblo Bonito. She could not determine where these artifacts were manufactured, however. Third, there is no obvious disruption in the local settlement patterns. These patterns changed through time, but the changes were evolutionary rather than revolutionary, adaptations rather than replacements. Finally, burial data from the area are too scanty to make definitive conclusions, but no foreign influence has been detected (Eddy 1977). It is safe, I think, to conclude that the Chimney Rock community was not "conquered" by Chacoan traders or mercenaries.

Does the port-of-trade model fit the situation any better? Certainly, some of the model's nine characteristics are manifest at Chimney Rock, as identified below.

1. The Chimney Rock area is probably an ecozone, "vegetationally and physiographically intermediate between the mesalands to the south and the San Juan Mountains to the north" (Tucker 1981).
2. The Chimney Rock communities did not, as a collective entity, exercise political hegemony over surrounding populations. In fact, it seems that they were culturally enthralled by neighboring groups, especially Mesa Verde.
3. Local and long-distance trading was spatially separated: the former occurring between the major communities, while the latter was solely conducted at Chimney Rock Pueblo.
4. Items that were traded were probably used by the local elite: items such as turquoise pendants and inlays, obsidian artifacts, and decorated pottery. Locally available stone (cherts, chalcedonies, and quartzites) and utilitarian (plain gray) pottery were used by the local populace.
5. The foreign traders intervened very little, if at all, in the local politics, economics, and religion. Non-indigenous cultural traits are not evident at any site other than Chimney Rock Pueblo.
6. A formal trade agreement between Chimney Rock and Chaco is indirectly suggested by the temporal stability of the Chimney Rock Pueblo (A.D. 1076-1125, or almost 50 years) and the isolation of the foreign traders at this one locality.
7. The placement of the Chimney Rock Pueblo beneath the twin Chimney Rock pinnacles, and its two Chaco kivas, has ritual overtones and strongly suggests that the "profane" activities of trade were enveloped and sanctioned by the "sacred." Religious paraphernalia, locally defined as a curved, rectangular object of clay with punched holes, which may have been used as a holder of prayer plumes (feathers), are not limited to Chimney Rock Pueblo, but are also found at three residential sites in the High Mesa community.
8. Eddy (1977) has concluded that the Chacoan traders must have been male religious practitioners, or priests, who were knowledgeable about Chacoan masonry styles, architectural planning, and kiva construction. The preponderance of local ceramics at Chimney Rock Pueblo strongly suggests that Chacoan women did not accompany these priests (Eddy 1977).
9. Long-distance trading was confined solely to the Chimney Rock Pueblo. All other sites on Chimney Rock Mesa participated in intra-community exchange.

It is extremely tempting to conclude from these data that Chimney Rock Pueblo and the surrounding High Mesa community may have been a Chacoan port-of-trade. The evidence seems unambiguous, but I think it would be unwise to assume immediately that such a categorization is unequivocal. It is worthy, however, of further investigations.

CONCLUSIONS

This discussion has now come full circle: it started by questioning the conventional viewpoint that Chimney Rock Pueblo was a Chacoan Outlier, and it has ended with the novel proposal that this site and the High Mesa community were, in fact, a Chacoan port-of-trade. Have any new insights been gained, or have old concepts been carefully camouflaged with new trappings? I would like to think that the former, not the latter, is true. The new concept stresses the developmental character of the Chimney Rock settlement system: it developed in place over two centuries in response to natural and cultural factors. Late in its evolutionary trajectory, this indigenous

cultural phenomena established a long-distance trading relationship with another cultural phenomenon of greater organizational complexity, which emanated from Chaco Canyon. Deteriorating environmental conditions resulted eventually in the abandonment of the area and the emigration of local groups to more favorable locales. The collapse of the Chaco system is at least partially, if not wholly, attributable to the earlier collapse of local systems such as Chimney Rock.

I believe that the most exciting direction for future research at Chimney Rock should involve careful and thorough explorations of the Chacoan Connection. It would be immensely satisfactory if we could identify items found at Chimney Rock as originating from Chaco and vice-versa.

Techniques, such as trace-element analyses, may reveal that timber products or animal bone found at, say, Pueblo Bonito, could only have come from the San Juan Mountains. Or, they may reveal that turquoise found in the Chimney Rock Pueblo was mined at Cerillos, New Mexico. Explicit research designs testing such connections should be emphasized. The results will surely be exciting.

Wallace Ruin
Implications for Outlier Studies

Bruce Bradley[1]

Abstract — The Mission or Chaco Entrada Model may explain the establishment and re-establishment of outliers such as the Wallace Ruin and other sites in the Montezuma Basin. The Chacoan polity may have been primarily a theocracy that dispatched missionaries into indigenous population centers. The great house of an outlier may have been primarily a residence for the Chaco missionary while neighboring structures may have served as habitation for a general population of converts. The re-use of certain of the mission sites such as Wallace and Salmon may have resulted from a Chacoan spiritual revitalization in the mid-13th century.

INTRODUCTION

I believe that the case for Chaco affiliated central sites in Colorado has been made (Eddy 1977; Bradley 1988). Yet with all of the attention that the outlying areas have received, during and since the Chaco Project (Judge and Schelberg 1984; Powers et al. 1983; Marshall et al. 1979), it is still clear that we don't have enough information to state with confidence what the outliers really represent. A primary reason for this is the paucity of controlled excavations in these outliers. Surface survey can be very informative but it is not the best means of reconstructing functional and historical sequences. I believe that the results of the research at Wallace Ruin, in the Montezuma Valley of southwestern Colorado, illustrate the type of complexities that are probably typical of many central sites, including Chaco affiliated outliers.

ARCHITECTURE AND DATING

Although the research at Wallace Ruin is incomplete and there is a limited sample (20% of the architecture), a complicated sequence of construction and use has been documented (Bradley 1988). To date, Wallace has the earliest building dates (A.D. 1059 and possibly earlier) for a Chaco affiliated central site in Colorado.

There are four identifiable building phases distinguished by masonry styles, wall abutments, stratigraphy, architectural superposition, pottery assemblages, and in some cases, tree-ring dating. The earliest masonry architecture included a multistory U-shaped building. To date, four two-story or three-story rooms have been excavated, and three of these interpreted as back rooms. There are undoubtedly additional front rooms, but they have been either removed or heavily modified by later construction. It is also assumed that there is a kiva associated with this construction (fig. 1). Tree-ring dates from ground story roof beams date at least two rooms (ground and second story) to A.D. 1059 (Table 1). Cutting dates in the mid-1040's have also been recovered from a hearth under a wall of a room of this construction episode.

The masonry style found in this earliest construction is spalled-slab or scabbled masonry. It consists of a single width of slabs, many of which are bifacially shaped, set in thick mud mortar layers. Chinking with the shaping spalls is common, and in at least two walls there is a very fine veneer of small tabular pieces of stone. In one lower story wall this veneer is as fine as any I have seen anywhere. Recent excavations have also revealed that these walls were built on footers of clay and sandstone chunks. Walls taper from the bottom to the top, and there are insets on some room interiors between the ground and second stories. The construction method is one of massive architecture with preplanned layouts and multiple stories, all characteristics of Chaco great house architecture.

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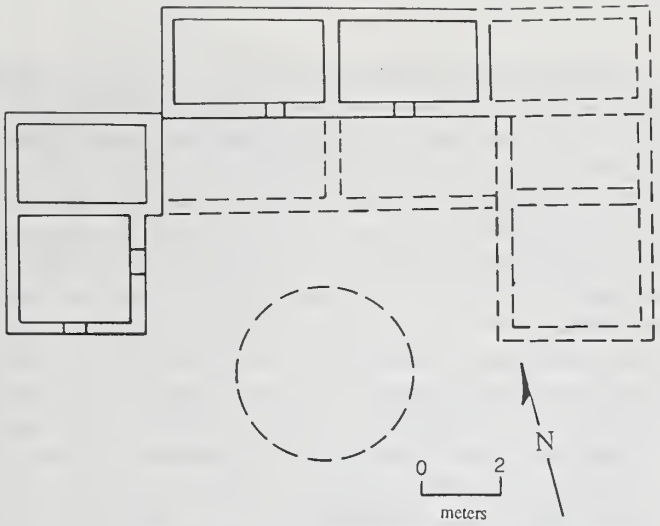

Figure 1. – Plan of first construction episode at Wallace Ruin.

This architecture contrasts with small site construction from the same time period in the area. Small sites tend to include a substantial amount of jacal; masonry is relatively coarse; walls lack footers and multiple stories; and, room blocks grew by accretion. Wallace Ruin truly stands out from the surrounding small house architecture – this difference is apparent as early as A.D. 1060.

A single two-story room represents the only excavated structure that originates in the second building phase. It was built onto the outside northwest corner of the original building. Although there was a lot of constructional wood present, its deteriorated condition precluded tree-ring dating. The masonry in the west wall (on the exterior exposure) closely resembles some of the banded masonry (Lekson 1984) in Chaco Canyon great houses. The use of these rooms and reuse of adjacent rooms resulted in the deposition of substantial quantities of Chaco Black-on-white and Mesa Verde white wares, indicating a date in the late 11th to early 12th centuries. Masonry style and artifact assemblages clearly indicate a Chacoan Connection.

The third building episode was massive and preplanned. It consisted primarily of rooms surrounding the then existing multistory structure and the addition of two built-in elevated kivas to the south and east (fig. 2). At this time, the site took on its distinctive U-shaped form with an enclosed plaza on the south. It is very similar to the floor plan of Wijiji in Chaco Canyon, probably built between A.D. 1110 and 1115 (Lekson 1984). Masonry closely resembles Chaco Type 4 (Lekson 1984); the walls were built on clay and stone rubble footers. Pecked-block masonry typical of the Mesa Verde area in the 12th and 13th centuries is lacking. Planned suites of rooms have been identified and construction was accomplished by the subdivision of a larger room. Of the two suites of rooms that have been excavated, one suite (northwestern) shows no evidence of habitation use and is accessible only through one small doorway on the second story. The other suite (southwestern) includes thermal features and a large T-shaped

Table 1. – Tree-ring dates from the first building episode.

			Date		
TRL No.	Field No.	Species	Inside	-	Outside
WLR-76	W-15-314	PNN	876	-	960vv
WLR-72	W-15-301	PP	943p	-	1057++r
WLR-71	W-15-297	PP	959	-	1059vv
WLR-74	W-15-304	PP	964p	-	1059vv
WLR-69	W-15-141	PP	663p	-	1059r

doorway opening into the enclosed plaza in the ground story front room suggesting living activities. Artifacts continue to show a direct Chaco Connection.

The final construction activity took place after A.D. 1200 and was primarily restricted to remodeling ground story rooms and adding three small Mesa Verde style kivas (more may be present but remain unexcavated). Remodeling included the blocking up of some doorways, the removal of some second story roofs, and the addition of some doorways connecting previously unconnected rooms. Reuse of ground story rooms was extensive with the primary uses being burial chambers, deposition of reconstruction rubble and ritual refuse, and ephemeral habitation. Judging from the presence of only a few pecked blocks and beams in the roof of one intramural kiva that date from the mid-to-late 11th century (Bradley 1988), construction of new walls and roofs almost exclusively used materials available in the site. Dating the reuse of the site is based primarily on pottery associations, specifically Mesa Verde

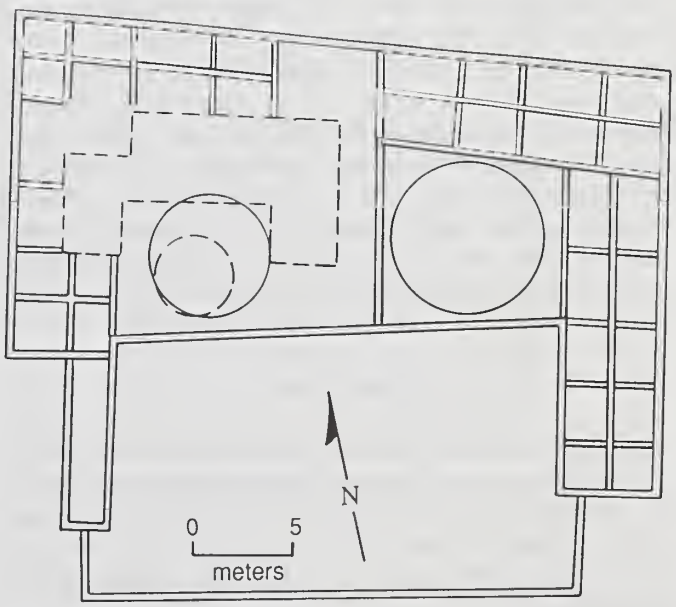

Figure 2.—Plan of third construction episode at Wallace Ruin.

Black-on-white. At this time, evidence indicates that there was an occupational/use hiatus at Wallace Ruin between about A.D. 1150 and 1200. It is possible that unexcavated areas of the site contain additional evidence that could change this interpretation.

The function of Wallace Ruin during the 13th century reuse seems to have been specialized. There are indications that activities such as cooking were taking place, but these are ephemeral in nature. The most evident activities were human burials and deposition of what may be ritual refuse. This refuse contains large numbers of a variety of artifacts but little to no ash. With the exception of the pottery vessels, the great majority of artifacts were "discarded" in functional condition. Detailed assemblage studies are still to be done, with comparisons between the suspected ritual refuse and external midden secondary refuse being a priority.

My present interpretation is that the 13th century reuse of Wallace Ruin was primarily for religious/ritual purposes, including disposal of the dead, and that this reuse was intermittent. These activities are reminiscent of those found at Aztec West (Morris 1924; Morris 1928) and Salmon Ruin (Powers et al. 1983) in New Mexico.

ARTIFACTS

Artifactually, there are a lot of similarities between the materials recovered from Wallace Ruin (11th and 12th century deposits) and great house sites in Chaco Canyon. The most obvious is pottery. Chaco Black-on-white is well-represented at 4% of all painted types, excluding Mesa Verde Black-on-white. Other non-local types are also relatively well represented including San Juan red wares, Tsegi orange wares, White Mountain red wares, and a Mogollon smudged red ware, among others. The presence of these non-local pottery types is in marked contrast to the pottery assemblages from Chimney Rock and other outlier sites such as Lowry and Escalante. Wallace Ruin has also produced other artifacts that, in type or relative proportions, are more typical of Chaco great house sites than small house sites in either the Chaco Canyon or Mesa Verde areas. Examples include "plume holders" (see the "Clay Sourcing at Chimney Rock: The Inside View of the Outlier Problem" chapter), high projectile point to painted sherd ratios (Bradley 1988), and large numbers of ornaments (including turquoise, inlays, marine shells, figure-8 beads, etc.).

MODEL

I believe all of the evidence points to Wallace Ruin as being a central/great house site with Chaco Connections as early as the A.D. 1060's and up until around 1150. Even its reuse after A.D. 1200 indicates that it held a special symbolic significance to a culture whose connection with it was probably defined mythologically.

The main question of concern here is what does Wallace Ruin represent in terms of the Chaco Connection? I believe that what I call a Mission or Chaco Entrada Model (fig. 3) may explain the establishment and reassertion of outlier sites, at least in the Montezuma Valley and Great Sage Plain of southwestern Colorado. This model is substantially based on a description of the Spanish missionization in New Spain (Spicer 1962). Whatever Chaco was, central/great house sites were well established by the middle of the 11th century, and it was some type of theocracy. In order to incorporate more distant populations into the system, missionaries were sent to establish themselves in the centers of these already established communities. Wallace Ruin was one such mission and was established as such by A.D. 1060. The mission at this stage took on the visage of grandeur and the role of central religious authority. It also served as a primary residence for the missionary (possibly of local origin but trained in Chaco Canyon). Through time, the connection with Chaco Canyon began to take on less significance, until in the second decade of the 12th century, a new and reorganized mission (fig. 3a) was reestablished. This reorganization was much more intensive than the initial establishment and was greater in scale. At this time, the mission was only the central focus of a much larger missionizing process. I believe there was a greater effort exerted to bring whole communities into the fold, evidenced by four functional site types. The first is a mission/residence and sacred structure that functioned as a habitation for the religious leader(s). When present, an east-west subdivision might indicate a dual organization of this leadership with two distinct religious

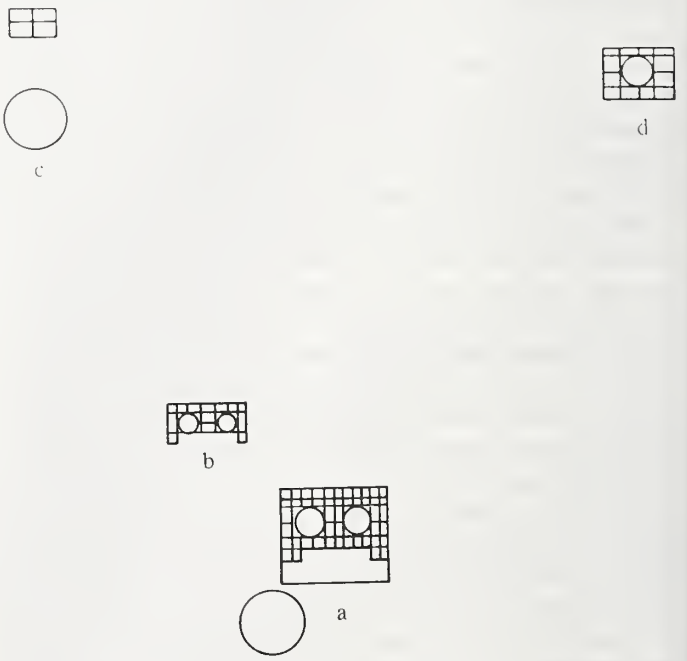

Figure 3.—Religious structures in a Montezuma Valley Mission Community. a) central mission; b) neophyte/service habitation; c) visita; and d) tributary habitation.

factions functioning side by side. Each side would have housed its representatives as well as have functioned as meeting and possibly storage spaces for their followers.

The second site type (fig. 3b) is found near a central mission and was established as a habitation that housed a general population of followers (possibly special service individuals or families) as well as the support population for the mission. Some of these structures would serve as locations for traditional religious activities incorporating the specialized Chaco religious symbolism. This symbolism is expressed in general site layout and kiva styles, but exotic goods and specialized religious objects would have been maintained primarily in the central mission. I consider these sites special service or support habitations. An example of this type of site is Ida Jean (Powers et al. 1983). Another alternative for this type of site is a separate but complementary religious order, perhaps more local in origin. This dichotomy is seen in Chaco Canyon (McElmo and Chaco style great houses) and Chimney Rock, as well as in southwestern Colorado.

At the same time that the central mission and surrounding neophyte/service sites were active, I believe a third type of religious structures (fig. 3c) was established in other outlying communities where the "mission" did not include a habitation for a religious leader. These locations would be serviced by priest(s) from the central mission, in accordance with a ritual calendar or with local need. This approach would be similar to the Spanish visita. These visitas would be made up of a central meeting place (a great kiva), associated ritual features (roads), and a small associated structure (possibly rooms for priests on overnight visits or special function rooms). Visitas would be located centrally in already established communities, but would also have attracted habitation units equivalent to the neophyte sites around the central mission. These sites would be occupied by trained local religious leaders. Exotic goods would be limited primarily to ritual activities and would not be expected to find their way into the archaeological record in any particular abundance, with the possible exception of shrines and offerings. An example of a Chaco visita might be the initial constructions (the great kiva and room-block of four large rooms) at Lowry Ruin (Martin 1936; Powers et al. 1983).

The fourth level of mission-related site is a small central mission outlier (fig. 3d) that was inhabited and maintained by an outlying population. These structures would not necessarily have been established by the mission per se but may have been founded by local inhabitants that "bought into" the system. These sites would also express the layout and kiva architecture of a central site, but would have been built as vernacular architecture. The residents of these structures and the surrounding small houses would supply goods and services to the central mission and would have received the benefits of membership (primarily ritual knowledge and perhaps training) in the overall organization. Generally speaking, I envision these folks maintaining their own customs, beliefs, and organizations, but also developing enough of a religious veneer to retain affiliation with the Chaco religious system. Unlike visitas, these structures may have been visited by a central mission priest only on rare special occasions and not on a regular basis or cycle. As with neophyte sites, few exotic goods would be expected in the archaeological record except for possibly shrines and offerings. A possible example of this type of site is Escalante Ruin (Hallasi 1979; Powers et al. 1983).

At the same time that the Chaco influence was being exerted through missionizing, other communities in the Mesa Verde area may have resisted this process, especially those communities on Mesa Verde itself. Along with resistance may have come imitation, at least in relation to community structure. This may be the case in the Far View Community, with Far View serving a central function.

The collapse or dispersion of the Chaco system in Chaco Canyon and the middle San Juan in the mid-12th century may not be the last evidence of the system in these areas. The reuse of some of the central mission sites such as Wallace, Salmon, and Aztec West, may have been an expression of an ill-fated Chaco revitalization in the mid-13th century. I believe that there was a massive disruption in the social, political, and religious organization in the Mesa Verde region beginning around A.D. 1240. In response to this stress, there may have been a Chaco revitalization movement that attempted to regain the glory of the "old ways" that were known primarily through mythology. Recognition and incorporation of the then abandoned central missions into this revitalization movement would have been a natural outcome. This might help explain the ritual nature of the reuse of these sites, including the final resting place for those that ascribed to the new movement.

CONCLUSIONS

This presentation has been an initial attempt to describe and explain the Chaco phenomenon in the Montezuma Valley and Great Sage Plain of southwestern Colorado during the heyday of the Chaco system in the 11th and 12th centuries, and the possible resurgence of a shadow of the system in the late 13th century. This is admittedly a simplistic model, but it may help point the way toward future modeling and research design development in this area. How the Mission Model might help explain the Chaco relationship at Chimney Rock is unclear. Surface evidence may allow us to identify possible central sites, but their affiliation with Chaco and their functional history can only be reconstructed through excavated data.

The Evolution of the Chacoan Polity

David R. Wilcox[1]

Abstract - In the 10th century a great house network centered on Chaco Canyon may have been established to achieve control over and obtain agricultural tribute from neighboring populations. A force of 500-1,000 warriors who could move rapidly along the wide roads may have been sufficient to control populations and obtain tribute. Great kivas may have legitimized claims to obedience and may have been the focal points for tribute collection. Construction of the Chimney Rock Pueblo in 1076 may indicate conquest of the region by Chacoan forces, and the great house served as barracks and a facility for collection of tribute. The rapid demise of the Chimney Rock fortress in 1125 may have been the result of the rise of militaristic power of Aztec.

The marvelous ruins of large buildings found in Chaco Canyon have intrigued generations of archaeologists since the middle 19th century when they were first reported. The discovery that similar sites occur throughout much of the Eastern Anasazi area to a distance of well over 100 miles from Chaco Canyon, and that some of those sites are connected to the Canyon by prehistoric roads, has intensified modern interest (Vivian 1990). One of the first of these outlying sites to be investigated was Chimney Rock Pueblo (Jeancon 1922). Its subsequent more detailed study (Eddy 1977) contributed significantly to the continuing discourse about the nature of things Chacoan. The present volume adds important new data and ideas to that discussion; this chapter is an effort to further enlarge the debate.

My objective is to sketch a model of the political evolution of the Chacoan system, which I interpret as a multi-settlement polity. It is argued that many structural transformations of that polity occurred, and its relationships with its neighbors were far from static. Although I try to show that the model fits current facts admirably well, it also proposes interpretations many will find controversial. That is what it is intended to do. The value of any model should be judged primarily by how well it stimulates the asking of new questions and the discovery of new facts. How closely it matches what we think is true about the past can then be judged by comparing its productivity and parsimony with competing theories.

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10TH CENTURY BEGINNINGS

After A.D. 900, the cultural experience of populations on the Colorado Plateau was highly varied. By the late 800's, the Dolores Valley village network disappeared and, archaeologically, human populations in the greater Mesa Verde area became largely invisible until after A.D. 1000 when a new great-kiva network developed (Varien et al. 1990). Mesa Verde in the 900's was an occupied island in an abandoned landscape during the Ackmen phase (Hayes 1964; Rohn 1977); it may have been a refugium. That the early 900's were troubled times is shown by palisaded household sites in the lower Piedra Valley (Eddy 1966) and by a series of massacre events (Bennett 1966; Flinn et al. 1976; Wilshusen 1986; Lightfoot 1987; Fetterman et al. 1988; Wilcox and Haas 1992). The rise of the Chacoan polity in the 10th century is correlated with the withdrawal of the Piedra populations upstream, away from Chaco Canyon.

In the southern San Juan, the general character of organizational relationships in the 8th to 10th centuries is still largely unknown, but a few notable facts do provide some intriguing clues. In Basketmaker III and Pueblo I times, large populations were apparently centered along the Chuska Slope and in the West Puerco Valley (Graves 1990), the Red Mesa Valley, the Pueblo Colorado Valley, and the Tohatchi area (Reagan 1929; Marshall et al. 1979; Vivian 1990; Roger Anyon and Dennis Gilpin, personal communications 1990). The full extent of the distribution and site structure of these settlements remains to be described, but Vivian (1990) suggests the expansion of a White Mound-Kiatuthlanna (Cibola White Ware) cultural system to the east and north in Pueblo I times. True

villages of 100 or more people probably existed along the Chuska slope at such sites as Skunk Springs (Marshall et al. 1979).

Chaco Canyon then was a marginal agricultural oasis on the periphery of the Cibola White Ware social network (Tainter 1988; Judge 1989). Located about 2 days travel (44 miles; explained later) from other inhabited areas (fig. 1 and Table 1), it may have become a refuge for people displaced due to the collapse of the northern San Juan village network (Vivian 1990; Varien et al. 1990).

Already in the 850's, the oldest part of Pueblo Bonito was built (Jeffrey S. Dean, personal communication 1990), and it may already then have been a two-story great house. Like the arc-shaped room blocks and associated pithouses of the contemporary Dolores villages (like McPhee village; Kane 1989), Pueblo Bonito in the late 9th century was probably the residential domain of a suprahousehold group which was part of a community more dispersed than those in the north. Whereas in McPhee village there was a continuous gradation from large and complex arc-shaped room blocks to small and poorly developed ones (Kane 1989), the Pueblo Bonito case suggests that a sharp contrast between big and small houses had already emerged there by the middle 800's. That pattern of a great house/small house contrast would become characteristic in dispersed communities throughout the Eastern Anasazi area in the next three centuries (Marshall et al. 1979; Powers et al. 1983; Judge 1989; Lekson 1991). The great houses thus were not towns as earlier analysts proposed (e.g., Vivian 1970) but the residential domains of elite suprahousehold groups and possibly their retainers (Schelberg 1984).

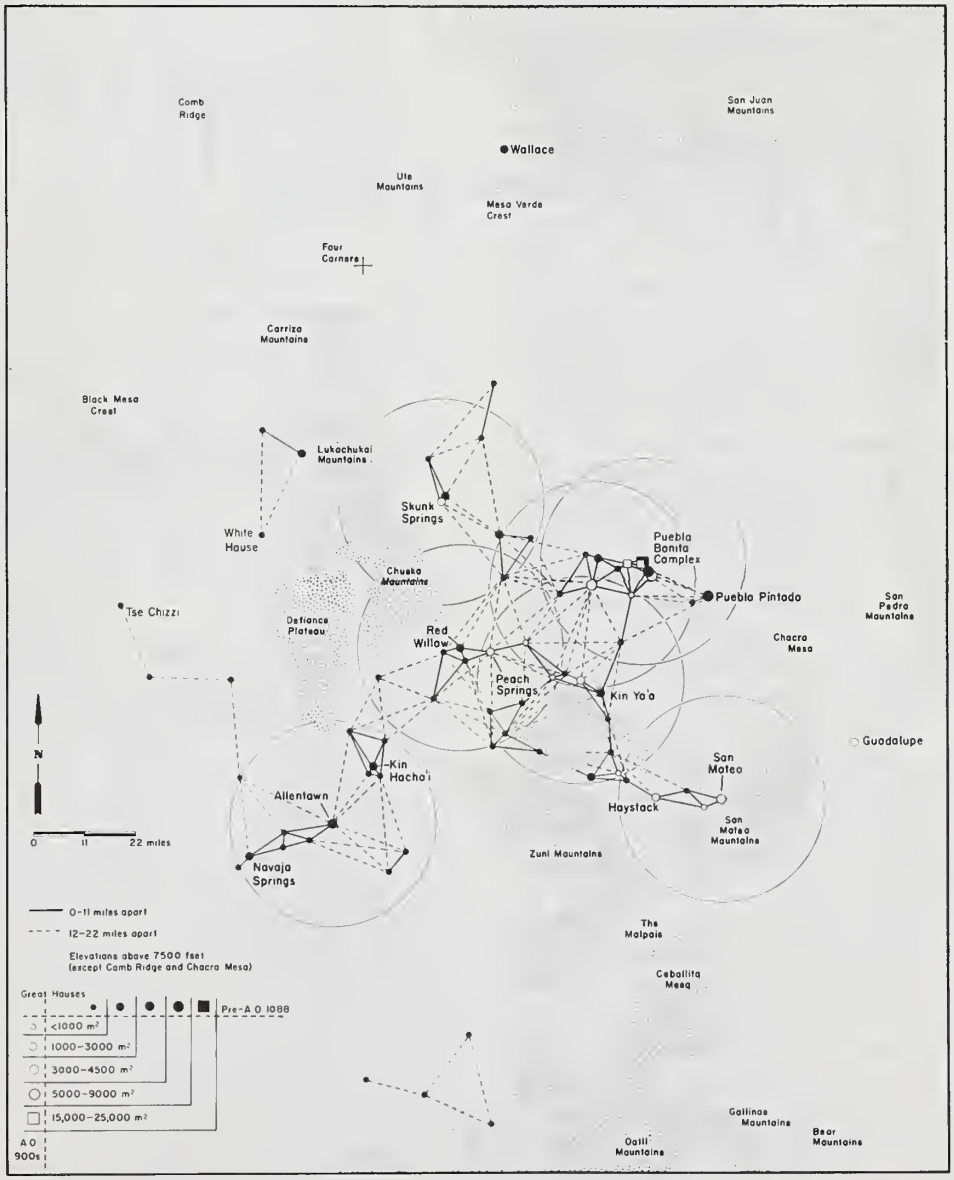

Figure 1.—Eastern Anasazi houses.

Table 1.—Organizational parameters of Chacoan and Chacoan-like great houses.

A: CHACOAN GREAT HOUSES

Map Ref	Site Name	Total est Fl Area: (sq. m)	Size Rank	Org. Type	Great Kivas	Tower Kiva	Sources
Central Palace Complex							
	Pueblo Bonito	18530	1		3	no	1,2,3
	Chetro Ketl	23395	1		2	yes	1,2,3
	Pueblo Alto	8260	2		0	no	1,2
	P. del Arroyo	8990	2		1?	no	1,2,3
	New Alto	645	4	M	0	no	1,2
Inner-Canyon Associates							
	Penasco Blanco	15010	1		4	no	1,2,3
	Una Vida	8750	2		2	no	1,2
	Kin Nahasbas				1	no	4
	Hungo Pavi	8025			1	no	1,2,3
	Kin Kletso	2640	3	2M	0	yes	1,2,3
2	Wijiji	2535	3		0	no	1,2
	Casa Chiquita	1460	3	M	0	no	1,2
Extra-Canyon Associates							
4	Pueblo Pintado	5935	2		1	no	1,2,6
3	Bisa'ani	1040	3	dual	0	no	1
	Greazy Hill	780	4	?	?	?	22
	Escavada	?	4	?	?	?	22
	Kin Indian	875	4	?	?	?	22
5	Pierre's	315/255/505	4	M/?/2K	0	no	1
15	Halfway House	145	4	no K	0	no	1
6	Padilla Well	900+	4	?	160m	?	5
7	Casa del Rio	1250	4	no K	0	no	5,6
8	Lake Valley	230+	4	no K	0	no	6
1	Tsin Kletsin	3440	3		0	yes	1,2,5
12	U. Kin Kletsin	470	4	1K	0	no	1
13	Greenlee	255	4	1K	0	no	1
14	Bee Burrow	450	4	2K	0	no	1,6
130	Tse Lichii	300	4	M	?	yes	22
131	Chaco East	750	4	?	?	?	22
9	Kin Klizhin	2395	3	2K	0	yes	1,6
10	Kin Bineola	8225	2		1?	yes?	1,6
11	Indian Creek	200	4	M	0	no	5,6
Chuska Slope Group							
88	Teec Nos Pos	555			4	no	7,10
62	Mitten Rock	800				no	10
20	Sanostee	325+	4	2K	2	no	6
21	Great Bend	1800	3		0	no	5,6
47	Tocito	372+	4	2K?	1	no	6
48	Newcomb	1000	3		1	no	5,6
49	Skunk Springs	1935	3	2K	0	no	3,6
Figueredo Wash Group							
132	Quatro Payasos	370	4	?	?	?	22
24	Standing Rock	630	4	no K	300m	no	6
22	Whirlwind House	500	4	1K	0	no	5,6
23	Peach Springs	1880	3		0	poss	1
50	Red Willow	1064+	3	2K?	20m	yes	8
51	Figueredo	580+	4	2K	1	no	6
52	Gray Ridge		4			no	6
53	Thunder Ridge	400	4		2	no	7,10
54	Twin Lakes	?	4?		60m	no	6
55	Toh La Kai	800	4	2K	1	no	5,6
Muddy Water Group							
25	Dalton Pass	825	4	2K	1	no	6
26	Section 8	280	4	2K	0	no	5,6
27	Muddy Water	1205/575/390	3/4	1K/1K/2K	135m	no	5,6
28	Kin Ya'a	1845	3	2K	20m	yes	1,6
129	Blue Water Spr	300	4	?	1?	?	22
Haystack Group							
29	Coyotes Sing Here	500	4	2K	0	no	5,6
30	Casamero	635	4	2K?	65m	no	3,6
31	Andrews	750	4	2K?	45m	poss	5,6
32	Haystack	2055	3	2K	1	yes	5,6
33	Kin Nizhoni	550	4	2K	0	no	5,6
34	El Rito	795	4	2K?	1?	poss	5,6
35	San Mateo	4125	3	2K	0	no	5,6
128	Kin Bee Tsahyoh	1050	3	2K?	3	no	23
Guadalupe Isolate							
36	Guadalupe	1400	3	2K	0	no	1,9
Upper Puerco West Group							
57	Coolidge	291/680	4	dual	2	no	5,6
56	Fort Wingate	466+	4		1	no	6
127	Pinedale	400	4	?	?	?	22
126	Church Rock	?	4?	?	1	?	22
125	Iyanbito	?	4?	?	1	?	22
Middle Puerco West Group							
66	Tseyatoh	?	4?	?	1?	no	8
67	Hunter's Point	693	4	2K?	1	no	8,10
68	Kin Hocho'i	1196+	3	2K?	1	no	8
69	Woyle A'din	128+	4	?	0	no	8
70	Stepping St House	220+	4	1K	0	no	8
71	At'see Nitsaa	441+	4	?	1	no	8
72	Allentown	3460	3		2	no	1,3
74	Gonzalas Well	850+	4	2K?	0	no	8
75	Bosson Well	?	4?	?	?	?	8
94	Blackrock Gaddy	1400				no	10
119	Bad Dog Ridge	950			1	no	10
120	Wide Ruin		4			no	10
95	Houck	200	4	2K?	0	no	1,7,8
96	LA 38011	900+	4	?	?	?	8
73	LA 38012	?	4?	?	?	?	8
97	Sanders Ruin	?	4?	?	1?	?	8
98	Sanders Pueblo	360	4?	?	0	?	6,8,10
99	Chambers	680	4	2K?	1?	no	8,10
100	Navajo Springs	1050+	3	2K?	1	no	3,7,8
121	Navajo South	600		?	1	no	10
122	Kin Trinklbert	200	4	?	1	no	10,22
123	Canyon Butte	950	4	?	0	no	10,22
Chimney Rock Group							
60	Chimney Rock	2535	3	2K	670m	no	1,11
	5AA8	?	4?	?	?	no	12
Animas/La Plata Group							
16	Twin Angels	470	4	2K	0	no	1
17	Salmon	8320	2		1	yes	1,3,13
18	Jacques	?	4?	?	?	?	13
19	Sterling	1685	3	2K?	1?	no	1,14
37	Aztec West	15030	1		1	no	1,3,13
37	Aztec East	9295+	2	dual	1	no	1,13
37	Aztec North	2100	3	no K	2	no	13,22
38	Kello Blancett W	4000	3	?	1?	no	13,22
38	Kello Blancett E	?	3?	?	1?	no	22
39	Jackson Lake	?	4	?	1	no	13,22
40	Morris 39	730	4	2K	110m	no	1,15
41	Morris 41	2875	3		1	yes?	1,15
42	Morris 20	222	4	3K	0	no	15
43	LA 2519	?	4	?	?	no	13,22
44	Squaw Springs	312+	4	2K	65m	no	6
San Juan Group							
45	Eagle Nest	?	4	?	?	no	13,22
46	Hogback	205	4	1K	1	no	1,6
61	El Malpais	1200+	3	2K?	1	no	13,16

B: CHACOAN-LIKE GREAT HOUSES

Map Ref	Site Name	Total est Fl Area: (sq. m)	Size Rank	Org. Type	Great Kivas	Tower Kiva	Sources
Northern San Juan Group							
83	Wallace	1080	3	2K		no	1,12,17
83	Ida Jean	695	4	2K	1	no	1,12
83	Haynie		3			no	12
84	Escalante	455	4	M		no	1,18
105	Reservoir		4		1	no	12,18
85	Casa Negra		4		1	no	12
86	Yucca House	1190	3			no	3,5,18
87	Yellow Jacket				1	no	12,18
106	Lancaster				0	no	18
107	Lowry	870	4		1	no	1,19
108	Ansel Hall					?	12
109	5DL860		4			?	12
110	Montezuma					?	12
111	Cottonwood Falls				1	?	12
112	Arch Canyon					?	12
113	Et al	457	4	2K	1	no	12
114	Bluff Cemetery				1	?	12

Table 1.—Organizational parameters of Chacoan and Chacoan-like great houses *(continued).*

Map Ref	Site Name	Total est Fl Area: (sq. m)	Size Rank	Org. Type	Great Kivas	Tower Kiva	Sources
Chinle Group							
133	Lukachukai	?	3?	?	?	?	22
63	Round Rock	400	4	no K	0	no	7,10
64	White House				0	no	3,20
Pueblo Colorado Group							
65	Kin Lichee	?	4	2K	0	no	3,7
90	Bear Squats	420+	4		3	no	3,7
91	Ganado	200	4	?	1	no	7,10
92	Cornfields	?	4?	?	0	no	7,10
93	Sunrise Springs	800	4		1	no	3,7,10
North Hopi Group							
89	Salina Springs	?	?	?	0	no	3,7
115	Burnt Corn	340	4	2K?	0	no	7,10
116	Whippoorwill	375	4	2K?	0	no	7,10
117	Tse Chizzi	666	4		2	no	3,7,10
118	Toyee	200				no	10
Zuni Group							
58	Village of Gt K	590	4	2K	1	no	1,3
	Spier's 81	500	4	2K?	1	no	21
Cebolleta Mesa Group							
59	Las Ventanas	900	4	no K	250m	yes	6
80	North Pasture	c.2300+	3	no K	0	no	8
81	LA 11670	300+	4	no K	1	no	8
82	LA 1341	1225+	3	no K	0	no	8
79	Dittert	?	4?	?	1?	no	8
Kin Cheops Group							
76	Cerro Prieto	?	4?	M?	0	no	8
77	Kin Cheops	1950+	3	no K?	1	poss	8
78	Hubble Corner	c. 100+	4	no K	1	no	8
103	Largo Gap	?	?	?	1?	no	8
104	Danson's 202	?	4	no K	1	no	8
101	LA 4030	c. 700+	4	no K	0	no	8
102	Cox Ranch	c. 700+	4	no K	1?	no	8

Key:

Fl Area: Floor Area; The numbers with a "+" are estimates of the first-story floor area of room blocks only, while the other numbers include estimates of higher story floor area and plazas.

Size Classes: see key, Figure 4

Organizational Type: K: kiva; M: McElmo; dual: two room blocks

Sources:
1. Powers et al. 1983
2. Lekson 1984
3. personal observation
4. Mathien and Windes 1989
5. Shelberg 1984
6. Marshall et al. 1979
7. Gilpin 1986, 1989
8. Fowler et al. 1987
9. Pippin 1987
10. Dennis Gilpin, personal communication 1991
11. Eddy 1977
12. Varien et al. 1990
13. McKenna and Stein 1988
14. Bice 1983
15. Morris 1939
16. McKenna 1988
17. Bradley 1984
18. Kane, this volume
19. Martin 1936
20. Lekson 1991
21. Keith Kintigh, personal communication 1991
22. Stein 1991
23. Copeland 1985

This social innovation, which is first apparent in Chaco Canyon, indicates the emergence of a two-class system of elite rulers and commoners (Toll 1985; Judge 1989; Vivian 1989, 1990). Vivian (1990) and Varien et al. (1990) do agree that two different ethnic groups merged in Chaco Canyon in the early 900's. By analogy with African examples (Mair 1964), we might infer that this came about because people displaced from the northern Pueblo I network either became dominant in the canyon (perhaps being invited in, after which they built the arc-shaped additions onto Pueblo Bonito and other great houses, converting them into the form so characteristic of the northern villages), or (and I think this is less likely) they became a subservient population of retainers who were given land by the Chacoans. Either way, a two-class system of patrons and clients could have come about, and it is significant that Mair (1964; Maine 1861) sees the operation of a two-class system as a central process in the emergence of social complexity. A two-class system has also been proposed for the Cahokia system that was emerging about the same time in the Eastern Woodlands (O'Brien 1989; Milner 1990).

In A.D. 919, two arc-shaped wing walls were added to Pueblo Bonito and similar great houses were soon built at Penasco Blanco, Una Vida, and Hungo Pavi (Lekson 1984; Ahlstrom 1985; Mathien and Windes 1989). The evidence for other 10th century great houses is less certain, but the presence of Type 1 masonry and a few tree-ring dates suggests that several were built in the southern part of the San Juan Basin south of Chaco Canyon, including Kin Bineola which guarded the southern approaches to the Chaco Canyon sites (Marshall et al. 1979; Powers et al. 1983; Judge 1989).

Ceramic data show that the area south of Chaco to the Red Mesa Valley was part of an interaction sphere centered on Chaco in the 900's (Toll 1985). Great kivas were distributed throughout this network in sites with and without great houses, but apparently these kivas did not yet have the floor features later so characteristic of Chacoan great kivas (Marshall et al. 1979; Powers et al. 1983). A ceremonial exchange system linking Chaco to its southern neighbors is thus indicated, but what the politics of this system were is uncertain.

One of the ritual goods used to dedicate great kivas was turquoise (Mathien 1991). Significantly, Guadalupe Pueblo (Pippin 1987) was apparently built in the middle 900's as a Chacoan Outlier on a high, defensible mesa over two days travel from Pueblo Bonito (fig. 1). It was in a gateway location (Hirth 1978; Lyneis 1984) vis-a-vis the Rio Grande Valley and the Cerrillos turquoise mines (two and a half days travel farther to the east), and turquoise clearly had become an important valuable in Chacoan society during the time of Red Mesa Black-on-white in the 900's and very early 1000's (Mathien 1979). Judge concludes that, "one cannot question the large quantities of turquoise associated with Red Mesa sites in the canyon, the fact that it is most frequently manifest as workshop debris, and the possibility that there was some full-time specialization of production" (Judge 1989).

Just how the Chacoans obtained the turquoise is still a puzzle. Few people lived in the vicinity of the Cerrillos mines in the 10th century (Cordell 1989), nor are there Chacoan habitation sites near them (Warren and Mathien 1985). Wiseman and Darling (1986), however, have reported pueblo sites near the mines that have a predominance of Chacoan pottery and turquoise manufacturing debris, and it appears most likely that expeditions were sent from Guadalupe or other southern great houses to mine the precious stone. This hypothesis accounts for the unusual quantities of turquoise at San Mateo (Mathien 1991). The predominance of Chacoan varieties of Red Mesa Black-on-white and graywares in the lower Puerco Valley of the East and areas to the east (Cordell 1989) is further testimony of Chacoan dominance in these areas.

HUMAN SACRIFICE IN CHACOAN RITUAL

The famous sub-floor burials in Old Bonito (Pepper 1909, 1920; Judd 1954), of which there were three pairs, including at least five fully extended adult males (Akins 1986), may all date to late Red Mesa times, given the association of this pottery with one of these skeletons and its presence above the floors of several others (Judd 1964; Akins 1986). One of these sub-floor burials (Pepper 1909) had over 7,500 pieces of turquoise associated with it, as well as a Strombus trumpet and 4 whole haliotis shells and a turquoise-encrusted basket containing a bird (?) fetish smothered in turquoise and over 3,000 shell beads.

The haliotis, and probably the shell beads, came from the southern California coast, over 600 airline miles to the west. Although Rafferty (1989, 1991) has proposed that the Lost City complex in southern Nevada (Shutler 1961; Lyneis 1986) was an entrepot for Chacoan access to both shell and turquoise, it seems more likely that the shells were heirloom items, acquired from western sources during the earlier Pueblo I or Basketmaker periods, and that the turquoise was from Cerrillos. In any case, these rare items afforded this man with what Duby (1974), speaking of an early European context, has called a "halo of magnificence": the turquoise and shell jewelry provided him with a tangible, sumptuary expression of his special glory. What could his role in Chacoan society have been?

The so-called Magician burial (McGregor 1943), which was also a fully extended adult male, but one dating perhaps two centuries later, also had a whole haliotis shell and a turquoise-encrusted basket (arm-band?). Another adult male like this was excavated at the Fitzmaurice Ruin near Prescott; it, too, had a whole haliotis shell and turquoise mosaics (Barnett 1974). These men may have been mimicking Chacoan political and social forms (explained later). The fact that the nature of the death ceremony indicated for the Magician suggested to Hopi elders that this had been a war leader and the last member of a ceremonial group (McGregor 1943) is thus particularly fascinating. The skull of the Old Bonito burial was bashed in and there were other signs of violence on the body (Akins 1986); this man, too, may have been a high-ranking war leader.

Among the historic Pueblos, war leaders were "outside chiefs" who mediated the relations between the pueblo and the outside world (Dozier 1970). John Fritz's valuable analysis of the ideational relations embodied in Chacoan architecture confirms that, in life, the turquoise-rich men buried below the floor of Room 33 played such a role:

> *this room [33] lay very close to the axis of reflective symmetry of the town.... Thus, these individuals ... were located at the apex of social and sacred power. This location is at the junctures of the social aggregates to the east and west, of residential and storage spaces to the north and public and ceremonial spaces to the south, and, at a larger scale, of sacred being to the north and everyday activity -- for example, agriculture -- to the south. Thus, this location can be understood as symbolizing the fusion and perhaps mediation of these oppositions (Fritz 1978).*

Burials in Chaco Canyon are surprisingly rare and the sample recovered is both highly skewed toward women and children who are remarkably disarticulated. Many of the remains consisted of only a skull, or they lack a skull, or they are missing other body parts (Akins 1986). In Pueblo Bonito, these remains are restricted to eight room spaces in the oldest part of the site where ceremonial paraphernalia is also concentrated (Pepper 1920; Judd 1954) and, except for the six fully extended adult males below three of these floors, they are placed in successive levels in the room filled with ceramic associations that extend throughout the later occupation from Red Mesa to Mesa Verde Black-on-white times (Pepper 1920; Judd 1954, 1964; Akins 1986). The post-depositional explanations offered by Pepper (1920) and Judd (1964) to explain their disarticulation do not stand up to critical scrutiny (Akins 1986).

A pre-depositional process may better account for these data. I suggest that these disarticulated human remains, because they had sacred power due to their having been sacrificed in periodic religious ceremonies, were treated in a special way by being buried in restricted room spaces with ceremonial associations. They may have entered the site as tribute or war captives; one did have an arrowhead embedded in its back (Judd 1954), and their nutritional profile was rather poor (Akins 1986). Similar mass-burial deposits of what may be cumulative, sacred human sacrifices are also reported from Aztec (Morris 1924), Mesa Verde (Lister 1965) and Wupatki (Turner and Turner 1990); these assemblages often have rare pitcher forms associated with them. As a class of mass graves, these assemblages contrast with those Turner (1983) argues were the result of cannibalism, and should be explained differently.

The concept of ritual human sacrifice known in the Southwest is demonstrated by an identical decapitation scene on two separate Classic Mimbres Black-on-white bowls in which a priest dressed in a horned serpent costume holds what is probably a knife in one hand and a human skull in the other, with the headless body beside him connected to the skull by a zigzag line (Fewkes 1923; LeBlanc 1983). Furthermore, the Cosgroves (1932) at the Swarts Ruin found numerous isolated skull graves, some with pottery associations, and not all of which could be easily accounted for by post-depositional disturbance. Nesbitt (1931; Creel 1989) reports three cremations in Classic Mimbres seed jars containing only skull bones. The religious beliefs of both the Mimbres and Chacoans may have been much more Mesoamerican (and violent) than is presently accepted (Jelinek 1961; Fritz 1978; Brody 1983).

Remarkable confirmation of this inference was provided by Pedro Pino, the former governor of Zuni, who in 1881 told John Bourke that the Pueblos formerly practiced human sacrifice:

> *In the days of long ago (en el tiempo ed cuanto hay [prior to Spanish contact]) all the Pueblos, Moquis, Zuni, Acoma, Laguna, Jemez, and others had the religion of human sacrifice (el officio de matar los hombres) at the time of the Feast of Five, when the days are shortest. The victim had his throat cut and his breast opened, and his heart taken out by one of the Cochinos (priests); this was their 'officio' (religion), their method of asking good fortune (pedir la suerte) (Bourke 1884:196)*

It should be noted that death due to such causes would not be likely to leave physical traces on the skeleton. Further confirmation of this practice is portrayed in a kiva mural found at Pottery Mound (Hibben 1975).

The inference that most of the post-floor burials in Pueblo Bonito were the victims of human sacrifice is supported by additional evidence. A rare pottery form in Cibola White Ware is the cylindrical jar, which is generally thought to have been used in ceremonial events (Toll 1990). Seven of the eight burial rooms in Pueblo Bonito have one or more examples of these vessels, and the eighth was dug out with little documentation by Warren King Moorehead (Akins 1986; Toll 1990). In Room 28, which has access to Room 33 where the richest sub-floor burials are interred, 111 cylindrical jars were found piled up four deep together with a smaller number of pitchers and bowls (Pepper 1920; Toll 1990). Room 28 thus appears to have been a cupboard where these ritual vessels were kept. The number involved (over 100) suggests that a large group ceremony was periodically repeated, and, as a result, a few of the cylindrical jars were occasionally deposited with disarticulated human remains in special parts of Pueblo Bonito. The related fact that six fully extended adult males, which very likely had high status in the early history of the community, lie below these later burial deposits readily leads to the inference that the ceremonies involving the cylindrical jars, in part, memorialized these important people. Analogy with Mesoamerican religious practices in such circumstances makes intelligible the association of human sacrifice with these events. Conversely, the evidence for deliberate human sacrifice suggests a political organization anthropologists usually associate with social complexity.

TRIBUTE AND THE CHACOAN STATE

During the critical "long century" of 120 years from A.D. 919 to 1039, I infer that Chaco Canyon became embedded in a tightly integrated network of communities in the southern San Juan Basin (fig. 2). Accepting a finding of Robert Drennan (1984; Platt 1979:90-97), I assume that a person on foot could travel about 22 miles a day; hence the circles on Figures 1 and 2 (differences in the difficulty of the terrain are ignored). It follows that, if a person could go 22 miles in a day, then he could visit and return home from a place within an 11-mile radius. Accordingly, in Figure 2, I have connected the great-house/village nodes with solid lines if they are 11 miles or less apart; the nodes are connected by dashed lines if they are 11-22 miles apart, and by no lines if they are farther apart. The Chacoan great-house systems are thus displayed as a graph (Hage and Harary 1983) that reveals the potential for "daily" intercourse among great houses. A one-day circle (22-mile radius) is shown around the largest great house in each of the sub-graphs where several solid lines connect nodes. Graph-theoretic analyses are needed to measure the structural parameters of these networks, such as centrality (Hage and Harary 1983).

Powers et al. (1983) suggest that several new great houses were built toward the end of the long century, including Upper Kin Klishin, Dalton Pass, Standing Rock, and Casamero (fig. 2). This is a potentially testable claim that Vivian (1989; 1991) doubts, and his model of colonization from Chaco Canyon into neighboring areas in the late 11th century (Vivian 1989, 1990) is critically linked to this issue. I propose that there was a 10th century great-house network that became a polity centered on Pueblo Bonito. In the early 1000's, this polity, I infer, became a tribute-demanding polity (or state) that began to advance against its populous, agriculturally successful neighbors to the south and southwest, whom it began to incorporate into the polity.

The objective of such actions was control over the productive potential of these neighboring populations, so that their surplus would benefit the Chacoan polity. Surplus is what is produced for exchange (Lesser 1961), and its production depends on control over people. As Duby (1974) has noted in an analogous European context, "what constituted the real basis of wealth [food surplus] at that time was not ownership of land but power over men, *however wretched their condition*" (emphasis added). Through a combination of coercion and religious legitimization, intensification of production could be achieved, and the surplus could then be taken as tribute back to Chaco Canyon. The cost of transport in this unequal exchange system would be borne by the population paying tribute.

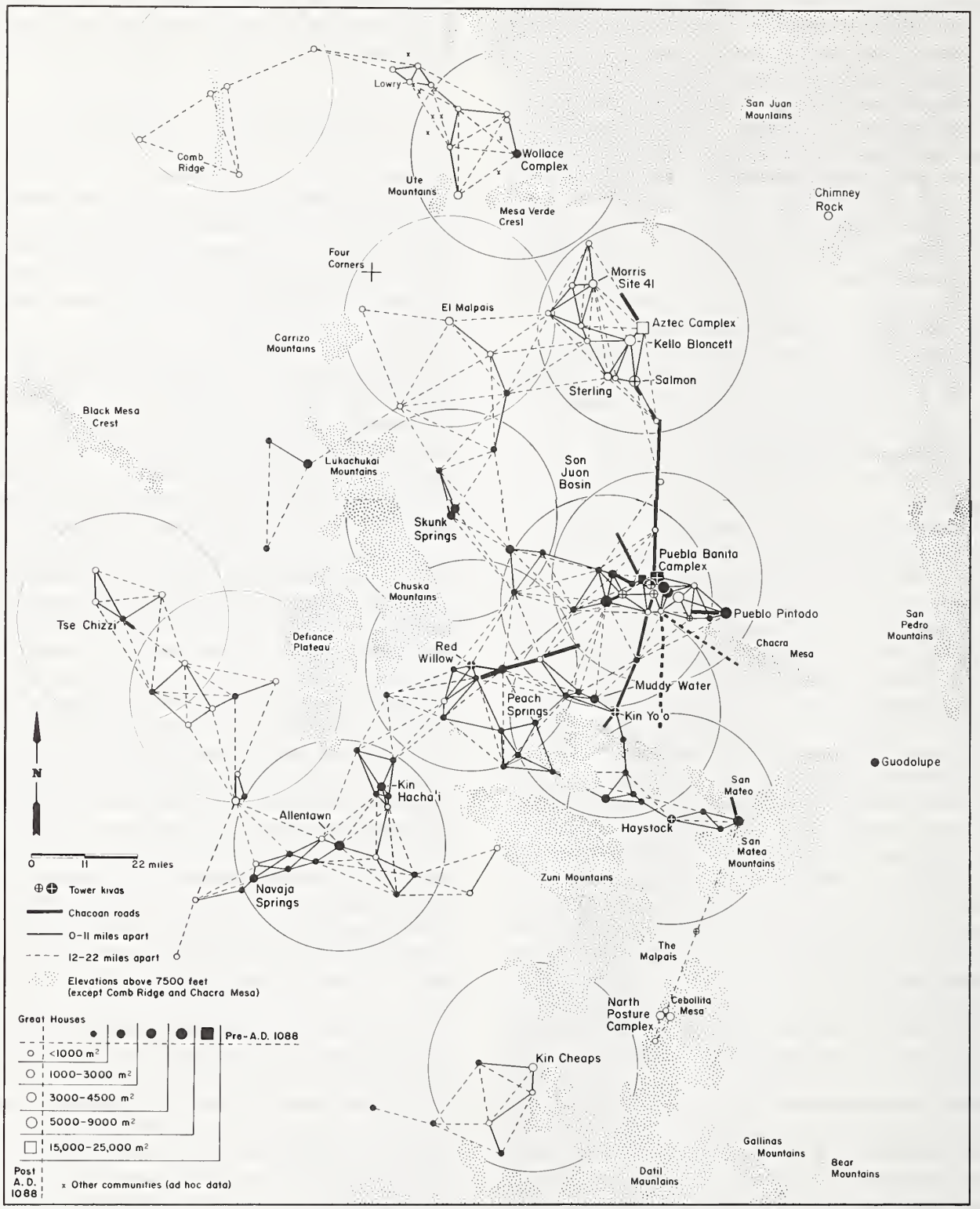

Figure 2.—Great houses built before 1088.

As in the so-called Dark Ages of Europe, "annual tribute was nothing more than the collection of booty made orderly and normal, for the benefit of any tribe which was sufficiently menacing for its neighbors to sense an interest in buying peace" (Duby 1974). The tribute would have been used to feed Chaco Canyon populations, to sponsor building programs, and to provide sustenance to the forces sent out to collect more. While the environmental potential of Chaco Canyon could hardly feed 2,000 people (Judge 1989), there were residential facilities for well over 5,000 (Hayes 1981; Judge 1989) -- and even more if the regular "kivas" are counted as residential space [Lekson 1988; Cater and Chenault 1988]). "Kivas" have hearths, while many of the surface rooms do not (Windes 1984) perhaps because the solar capture by Pueblo Bonito was so high (Williamson 1984). The collection of tribute, an unequal exchange system, explains how more than 2,000 people could be fed.

The tribute hypothesis also explains the high consumption rates in Chaco Canyon and the paucity of exotic goods in the outlying communities linked to it: "[The question of how the Chacoan system was maintained] is especially bothersome in view of the evidence suggesting that economic redistribution from the center to the peripheries was not practiced" (Dean 1989; Judge 1989). Models that posit the canyon as the locus of an equitable redistribution system or pilgrimage center cannot easily explain these facts, nor is the suggestion that turquoise was redistributed (Judge 1989) supported by current facts (Mathien 1991). To the contrary, this was a system based on the mobilization of resources, not their redistribution (Champion et al. 1984). Exceptions to these conclusions (Wallace, Aztec) date in the 12th century and indicate the emergence of a different pattern (explained later).

The success of Chaco's early efforts is seen in the construction of Chetro Ketl in 1037 and 1039, during which over 5,000 wooden beams were transported to the Canyon from over 2 days away (Dean and Warren 1983; Tainter 1988). Within a decade, Pueblo Alto was also built, the roads and stairways linking it with Pueblo Bonito and Chetro Ketl were probably in place (Windes in Lekson 1984; Lekson 1985), and a wall was built across the front of Pueblo Bonito (Lekson 1984), thus protecting its inhabitants by restricting access. In short, the administrative center, or capital of the Chaco polity, was rapidly expanded and differentiated, defensive features were added to Pueblo Bonito, and the stage was set for explosive, exponential growth. These are precisely the conditions expected by Charles Spencer (1987) for primary state formation.

In the next three decades after A.D. 1050, huge building programs added thousands of square meters of storage space to Pueblo Bonito and Chetro Ketl (Lekson 1984). Figure 3 summarizes these data, which are derived from Lekson's (1984) classification of construction events and average floor areas for room classes. Only back-rooms and comparably small rooms were counted as "storage" rooms. My inference is that a primary purpose of these large construction projects was to store tribute taken from neighbors as the Chacoan polity continued to expand. It should also be recognized that these buildings constitute monumental architecture comparable to that found in early states.

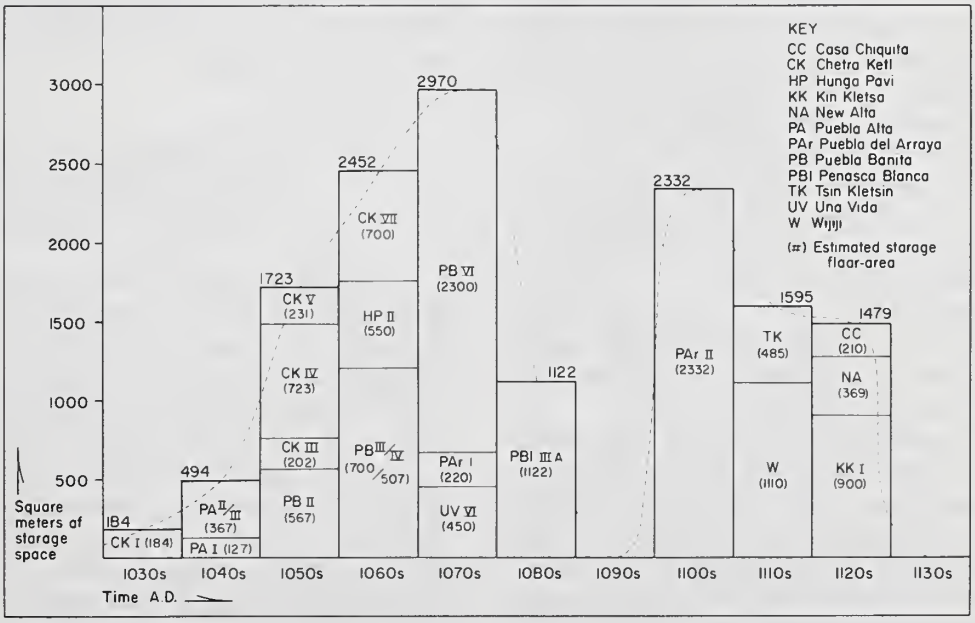

Figure 3.—Storage floor area added to Chaco Canyon great houses in large building programs, A.D. 1037-1130.

INTERNAL DIFFERENTIATION OF ADMINISTRATIVE FUNCTIONS

Whether we agree to interpret the Chacoan polity as an early state depends on the definition we adopt. Henry Wright offers the following criteria:

> *In contrast to a developed chiefdom, a state can be recognized as a cultural development with a centralized decision-making process which is both externally specialized with regard to the local processes which it regulates,* ***and internally specialized in that the central process is divisible into separate activities which can be performed in different places at different times*** *(Wright 1977; emphasis added).*

The differences and complementarity of functions among the buildings in the Pueblo Bonito complex may be offered as evidence for the "internal specialization" called for by Wright. Neither Pueblo Alto nor the later Pueblo del Arroyo or New Alto have great kivas, and at any one time both Pueblo Bonito and Chetro Ketl had one each, a manifestation of the dualism characteristic of Chacoan culture (Vivian 1990). Only Chetro Ketl had a tower kiva, while two artificial platform mounds were placed in front of Pueblo Bonito (Lekson 1984), and a tri-wall structure was built (and later razed) at Pueblo del Arroyo (Judd 1959). Organic solidarity in the management of the larger system is thus indicated; a more detailed behavioral analysis of these buildings would be welcome.

MILITARY FORCE AND ROADS

The size of the military forces necessary to dominate a social landscape of small-scale, dispersed communities of perhaps 50-150 each, or even communities of 200-300 (LeBlanc 1989), was probably not large. The laws of the Wessex King Ine in the 7th century A.D. suggest a suitable analogy:

> *if there are less than seven [aggressors], they are simply thieves; if they are more numerous, they constitute a band of brigands; but if there are over thirty-five, they may fairly be taken for an army (Grierson 1959, cited in Duby 1974; for a different translation, Jones 1984).*

An organized force of 500 to 1,000 warriors organized into squads and larger divisions, I believe, could have been housed at Chetro Ketl or Pueblo Alto and would have been a sufficient force to make the proposed system work.

The use of labor service (corvee) to build the famous Chaco roads (Obenauf 1980; Stein 1989) would have permitted such "armies" to move rapidly across the landscape, to work their will on local communities, and to return the rewards of pillage and tribute efficiently to the central storerooms. Like Roman roads, the Chacoan ones bypassed and ignored natural obstacles that separated the canyon from relatively rich agricultural areas two days travel away (Wickham 1989; Stein 1989). The principal alternative explanation for the roads is that they led to shrines or otherwise were simply part of a ritual landscape.

The Ganda Kingdom of East Africa provides an even more striking analogy for interpreting the Chacoan polity and its roads:

> *The other main responsibility of the territorial chiefs was to organize the supply of manpower required for the purposes of state. These purposes were three--warfare, the maintenance of the capital, and the maintenance of communications. The last of these was peculiar to Buganda. The headquarters of every saza [territorial] chief was linked to the capital by a road which he was required to keep in good repair... Every chief of lower rank was similarly expected to make and keep open a road from his residence to that of the chief senior to him....* ***Those that led to the capital were much wider than was necessary for people who had no wheeled transport****. They certainly enhanced the dignity of the capital, and made a great impression on the first Europeans who saw them. Even the narrower roads were wider than the paths over which people walked in single file in most of the rest of Africa. This system of communication is said to have made it easy to muster the army for war. For the maintenance of the roads within the capital, levies were summoned by the Katikiro [prime minister], as also for the maintenance of the buildings in the royal palace (Mair 1964; emphasis added).*

Is it too much to postulate Pueblo Bonito or Chetro Ketl as a royal palace, the capital of a simple state, with the Chacoan Outliers the seats of territorial chiefs tributary to the great families in the Canyon?

SITE HIERARCHIES, POLITY BOUNDARIES AND THE OUTLIER PROBLEM

A confusion has crept into discussions of great house architecture due to the different theoretical perspectives of several authors. Powers et al. (1983) infer that the great houses are outliers which were directly linked to Chaco Canyon in some way. Because of the variability in the masonry of Chaco Canyon great houses (Lekson 1984), they are a little more inclusive than I am in what I classify as "Chacoan," but my grouping is a set of outliers in the Powers et al. sense. Marshall et al. (1979) and Fowler et al. (1987), in contrast, recognize a tradition of Chacoan-related great houses and they are much more inclusive in what they call Chacoan. While agreeing that the great houses they have identified are analogous organizational forms, I argue

that many of them **are not outliers** with direct links to Chaco Canyon. (I do not discuss in this paper the post A.D. 1150 sites postulated to be a further elaboration of the great-house tradition, but I do agree there are organizational continuities.) Clearly, much more detailed, quantitative architectural analyses of great house and small house architectural variability is needed in which the behavioral processes of construction activities are analyzed and compared and contrasted. The hypothesis that there is a class of "Chacoan" architecture that requires specialist knowledge to reproduce can then also be tested.

In the Red Mesa Valley, the Puerco of the West, and along the edge of the Chuskas, new great houses and great kivas were built in the early to middle 1000's that are identical in architectural style to the Canyon great houses and great kivas (Roberts 1939; Altschul 1978; Marshall et al. 1979; Powers et al. 1983; Fowler et al. 1987; Graves 1990; Warburton and Graves 1991; Lekson 1991). This identity of architectural style and organizational form defines sites as "Chacoan," whereas those with similar organizational form, but a different architectural style, are presumed to be local products and are called "Chacoan-like" in Table 1. Construction of Chacoan great houses, possibly by masons (specialists) brought from the canyon (see the "Bonito Style Community Structures: Chimney Rock Pueblo in Regional Context" chapter), served to incorporate a community into the central polity and to regularize tribute demands, reducing the instability caused by periodic raiding. Chacoan great kivas, as places where the state cult was performed, legitimized the claims to obedience by the Chacoan polity and are the likely focal points for tribute collection.

Powers et al. (1983) and Schelberg (1984) have suggested a site hierarchy among great houses, defining large, medium and small classes. However, **all but four of their large and medium great houses are in Chaco Canyon**. In Figure 1, I have split their "small" class in half, arbitrarily taking 1,000 square meters as the cut point. While this classification is admittedly crude, that it approximates a meaningful functional hierarchy of sites is supported by the fact that the spatial clusters of great houses (Table 1) each have their own site hierarchy.

The Chacoan great houses lie in the midst of dispersed communities of small houses whose architectural style often contrasts with the great houses (Eddy 1977; Graves 1990; Wolcott Toll, personal communication 1990). Those communities were usually present before the great houses were built, and may have afterwards grown larger (Judge 1989; Varien et al. 1990; Graves 1990). These data suggest that "good Chacoan masonry" (see the "Bonito Style Community Structures: Chimney Rock Pueblo in Regional Context" chapter) is not simply a matter of the availability of tabular sandstone and that the introduction of a great house affected the subsequent development of the village. Cases of emulation of great-house architecture in some small houses are also reported (Graves 1990).

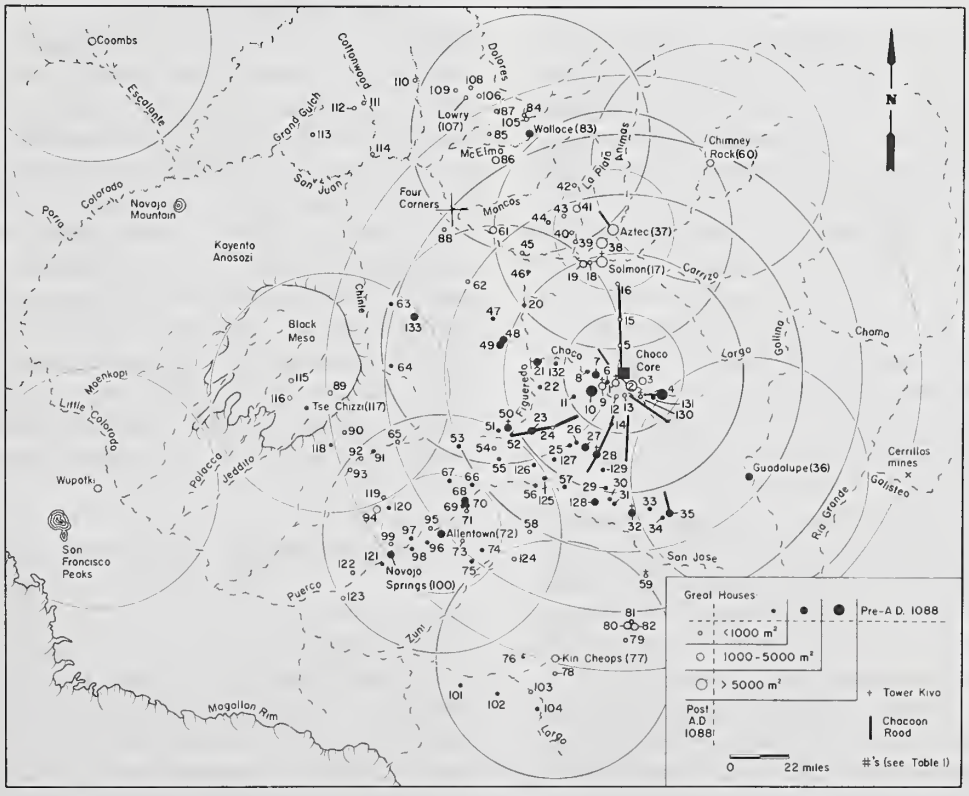

Figure 4.—All known Great Houses.

Figure 4 shows all of the great houses presently known. Noticing that San Mateo and Allentown, the two largest Chacoan great houses south of Kin Bineola (Roberts 1939; Powers et al. 1983; Schelburg 1984), are over twice as large as all others in the sub-graphs defined by sets of nodes connected by solid lines, and that their sub-graphs are more distantly connected to Chaco Canyon than some others, I introduced a fifth size class (of 3,000 to 4,500 square meters of great house size) in both Figures 2 and 4, so that these local size hierarchies can be better visualized.

The Rio-Puerco-of-the-West (Allentown) Group is particularly interesting. It is the sub-graph that has the most complex sub-hierarchy south of Chaco. Judging by the architecture of Navajo Springs, these sites could have been built by masons from Chaco Canyon (Graves 1990). Its largest great house, Allentown, has two multistory room blocks separated by a corridor (Roberts 1939), two-great kivas (judging by my pacing of them) and a high earthen embankment ("aureole":Stein 1987) surrounding both these features and a large plaza on their east side. Only Penasco Blanco, which is in the largest size class, also has two great kivas in its plaza (Lekson 1984). About a day away from Allentown are the relatively large outliers of Navajo Springs and Kin Hocho'i that are less than half the size of Allentown (fig. 4). Hence, Allentown is strategically located to maintain control in the whole site cluster.

Steponaitis' (1978) analysis of the political economy of tribute systems led to the prediction that secondary centers should be skewed in their location closer to the primary center than would be true in a market system. In Figure 3, both Kin Hochoi'i's and Allentown's locations in their sub-graphs do have such a location three and four days from Chaco, respectively, but later (fig. 4), once other great houses were built, Allentown appears in the center of the larger sub-graph. One interpretation of this is that Allentown began as a subordinate center and later became the head of an independent polity.

The structure of these data appear to support the claim of state-level organization, which Lucy Mair defines this way:

> *"If we were to try to put in a single sentence the essence of the state system, we might say that it consists in the delegation of power by the ruler who holds final authority, in such a way that he can expect his orders or decisions to be carried out throughout the land which he claims to rule" (Mair 1964).*

Quite possibly, local leaders were incorporated into the Chacoan elite system and were set up as Chacoan agents (territorial chiefs) in the great houses, their task being to arrange the regular transfer of tribute to Chaco Canyon. Alternatively, agents of the Chaco elite were sent out to administer these centers, or a combination of these processes occurred.

With the threat of reprisals to back them up, a Pax Chaco could have been established which would not have required many Chacoans to occupy any one great house. Even with well over 100 great houses (Table 1) -- not all of which were part of the same polity -- the necessary personnel could easily have been supplied by the Chacoan population, particularly if we realize that recruitment for these positions could have been drawn from all communities incorporated into the system (cf. LeBlanc 1989). Assuming the average size of a great house community was 200 people, by multiplying by 120 we find that the net size of these systems was on the order of 24,000 people. If there were many more dispersed communities on this landscape than the present "great house" classification counts, then the net population may have been considerably larger (Mark Varien, personal communication 1991).

THE THREAT RADIUS CONCEPT

The sites of Allentown, Navajo Springs, Chambers and Kin Hocho'i--and perhaps others--have earthen embankments ("aureoles") that fully enclose them (Fowler et al. 1987). I predict they will prove to be stockades. If so, and if they were built when the great houses were, they would support the claim that the populations of the agriculturally fertile Puerco-of-the-West were forcibly integrated into the Chacoan polity. However, the embankments contain much trash (Fowler et al. 1987), and it is more likely that they were built later than the great houses as a means of protection against outside attack rather than to protect the great house from the local community. Neighboring polities or the Chacoan polity would thus have been resisted by these counter-threat facilities. New research is needed to test these alternatives.

If we suppose that Allentown was (at least initially) subordinate to the Pueblo Bonito complex, it is apparent that the effective power of the latter extended outward at least four days travel from the canyon. Applying Kenneth Boulding's (1962) theory of conflict to these data, I suggest that the threat posed by the Chacoan polity to its neighbors in the 11th century was strong at least out to the four day threshold. I call this its "threat radius." Figures 2 and 4 show that Chaco was tightly integrated in a variety of ways to great-house sub-systems south and west of it out to a three-day threshold. This was probably the most stable part of the polity, with the Allentown and perhaps the San Mateo groups being more tenuously integrated into it. Spencer (1982; 1987), in contrast, has argued that the most efficient domain of a paramount chiefdom has a radius of only half a day's travel from the regional center.

INCORPORATION OF THE NORTHERN SAN JUAN VILLAGES

A remarkable fact about the Chaco road system (Stein 1989) is that what converges on Pueblo Bonito is a fan of roads to the west, southwest, south, and east, integrating the old interaction sphere and polity with the Canyon (Powers et al. 1983; Stein 1989). A single road plunges northward to the San Juan River, terminating at what was initially the largest great house in the north, Salmon, whose construction commenced in

A.D. 1088 (Stein 1989; Ahlstrom 1985). All of the Animas/La Plata is within about three days of Chaco. I propose that the construction of the Great North Road was coincident with the conquest of the Animas-La Plata-middle San Juan area, which I argue happened in the 1080's and 1090's (Bradley 1984).

In the north, both Wallace and Sterling have been interpreted as early great houses (Powers et al. 1983; Judge 1989), but they probably are not. Sterling's "spine" wall suggests most of it was built at one time, and the few non-cutting tree-ring dates led William Robinson to suggest that "the Sterling site is roughly contemporaneous with the Chaco occupation at Salmon Ruins" (Bice 1983). I thus infer that the Chacoan component at Sterling dates after A.D. 1088. At Wallace, two good clusters of dates, one from A.D. 1045 and the second at 1059-1060, is associated with the early Chaco-like component whose architectural style locally dates to A.D. 1000 to 1075 (Bradley 1988; 1991). However, although Bradley feels the component may be somewhat earlier, the roof with 1045 dates also has one beam dating A.D. 1071, and a room that fills out the northwest corner of the early component is dated by Bradley (1988:) in the period A.D. 1075-1100; the later Chacoan component dates in the early 1100's (Bradley 1988). It appears consistent with current facts to suggest that the earlier component at Wallace could date to the 1080's, like all other well-dated Chacoan components in the northern San Juan (Ahlstrom 1985; Varien et al. 1990), but the possibility that it began a generation earlier cannot be excluded.

Initially the largest great house in the north, Salmon, is located where it could efficiently transfer tribute to the Pueblo Bonito complex, as Steponaitis (1978) would predict. Soon, however, sets of dual pueblos similar to the pair of adjacent buildings seen at Pueblo Bonito and Chetro Ketl were built in the Animas Valley at both Aztec and Kello Blancett (Lekson 1984; Stein and McKenna 1988); Wallace-Haynie-Ida Jean might be another one farther north (Bradley 1984). Indeed, the Aztec complex appears to replicate the organizational forms of the Pueblo Bonito complex: East and West Aztec each have a great kiva and are connected to Aztec North by a road, and a tri-wall structure is present (Stein and McKenna 1988). At small sites, following the Chacoan invasion, intensification of production is indicated, and the number of exotic goods declines, as does evidence for interaction with Kayenta populations to the west (Meade Kemrer, personal communication 1990). The flow of tribute to Chaco Canyon (or a little later to Aztec?) is a hypothesis that accounts for these generalizations. Even farther north, the Kayenta redwares at the Wallace site (Bradley 1988) show that this polity was embedded in a different network of interaction.

In the upper San Juan, where small-scale and culturally distinct populations existed from at least Basketmaker times (Schaafsma 1980), the expansion of Chacoan political designs in the middle 1000's led to withdrawal upriver into thinly occupied areas along the Piedra River (Roberts 1930; Eddy 1966, 1977). Construction of Chimney Rock Pueblo in the strategic middle of this "backwoods" Anasazi community during the 1080's (Eddy 1977; Ahlstrom 1985) probably indicates the conquest of this group by the Chacoans. Eddy's (1975, 1977) conclusion that a group of Chacoan men intermarried with local women is compatible with my inference. Those men may have been religious specialists (Eddy 1977); I infer they also were warriors, and that Chimney Rock Pueblo was their barracks and a collection facility for tribute. Mobley-Tanaka's finding (see the "Intracommunity Interactions at Chimney Rock: The Inside View of the Outlier Problem" chapter), that there was a disproportionate concentration of storage on the upper mesa associated with Chimney Rock Pueblo, is just what we would expect to be true of a Chacoan great house. This relationship lasted only for two generations or less: by A.D. 1125, the whole Chimney Rock area was abandoned (Eddy 1977) (see the "History of Research at Chimney Rock" chapter).

THE EMERGENCE OF PEER POLITY INTERACTION

During the initial big surge of road and outlier construction in the north, which I infer took place in the last two decades of the 11th century, architectural investment in Chaco Canyon dramatically declined (Lekson 1984). Only the back wall of Penasco Blanco was apparently built then, and the fact that this occurred in 1088, the same year that Salmon was begun, suggests that a common stockpile of beams was used to build both. Chaco's investment during the 1080's and 1090's was in the incorporation of the San Juan populations into its system. The success of this northern expansion is marked in the first three decades of the 1100's by a new surge of construction in the Canyon (fig. 3), adding both a huge new storage potential at Pueblo del Arroyo (in the central administrative nexus), tower kivas (at Chetro Ketl, Kin Kletso and Tsin Kletsin) and several blockhouse-like (McElmo) structures (Lekson 1984). Concurrently, the Aztec complex was erected in the Animas Valley, beginning in the second decade of the 1100's (Ahlstrom 1985).

The tower kivas, many of which appear to date after A.D. 1110 (Lekson 1984), helped to improve long-distance communication along the roads, thus more tightly integrating the heart of the system (Drager 1976; Lekson 1984). Such signaling systems are often built in times of danger (Sawyer 1982). Tower kivas were built at Chetro Ketl, Kin Kletso, Kin Klizhin, Tsin Kletsin, Kin Ya-a, Red Willow, Haystack and Las Ventanas in the south, and at Salmon in the north (Marshall et al. 1979; Powers et al. 1983; Lekson 1984a; Fowler et al. 1987; Stein and McKenna 1988). The outermost ones are a little over two days travel from the canyon. The inter-visibility promoted by this system is incompletely studied, but current data are nevertheless remarkable:

> *"From Kiva A (at Tsin Kletsin and the highest part of the building) six other major buildings are visible: Pueblo Alto, Penasco Blanco, Kin Kletso, Kin Klizhin, Bis sa'ani, and*

Kin Ya'a. A shift of 10 m in any direction would have made these multiple views impossible" (Lekson 1984).

In general, tower kivas appear to be concentrated in the old southern polity, in Chaco Canyon and in the focal site for the northern conquest (Salmon); that is, they protected the heart of the system (fig. 1).

Another architectural innovation in the first decades of the 1100's was the construction of an arc of walls or rooms in front of the Canyon great houses (Lekson 1984), thus adding a defensive feature (Judd 1959). Together with the improvement of signaling systems, and the presence of the best-attested roads within the two-day approaches to the Canyon (fig. 1), it appears that the Chacoan polity by the early 1100's was having to defend itself from its neighbors, many of whom, by this time, had reorganized in ways similar to the Chacoan polity. With the emergence of these competitors, the politics were transformed into peer-polity interactions (Renfrew and Cherry 1988).

Interestingly, it was the dramatic and unprecedented rise and expansion of the Chacoan polity that probably provoked a radical reorganization of neighboring populations located three to six day's travel from the Canyon (fig. 2 and 4; Table 1). Great houses and great kivas in local, non-Chacoan masonry styles by the late 1000's were being built in areas east and south of Zuni, in the Pueblo Colorado Valley, and westward to Tse Chizzi (about 14 miles north of Keams Canyon), and to Toyee in the Steamboat area (Fowler et al. 1987; Gilpin 1989, 1991; Roney 1990). I infer that these data indicate the emergence of a series of polities organized to resist the further expansion of the Chacoan juggernaut (Gilpin 1989). That many of these Chacoan-like great houses are part of sub-graphs well separated from the well-connected Chacoan clusters (fig. 2 and 4) supports the inference of political independence. Interestingly, occupation at both Navajo Springs (possibly part of the Chacoan polity) and most of the East Hopi group (Gilpin 1989, 1991) may have ended ca. A.D. 1100-1150 (Graves 1990). These changes may be due to inter-polity conflict in the early 1100's.

Conditions in the San Juan drainage were more complex. West of the La Plata, great houses that may or may not have been part of the Chacoan polity were being built in the very late 1000's and early 1100's (Martin 1936; Morris 1939; Varien et al. 1990). Many of them are quite small, but the general pattern of site hierarchy (if there was one) has yet to be determined. Towers first appear on Mesa Verde in the Mancos phase, becoming more frequent later (Rohn 1977). There is also evidence of massacres farther west and north (Martin 1929; Morris 1939; Wormington 1955). What the political relationships of these people were to one another, to the Animas-La Plata system, or to Chaco Canyon is a fascinating question as yet unanswered. Rohn's (1989) suggestion that "Aztec more reasonably resembles a Northern San Juan town, into which a small Chacoan site-unit intrusion occurred," while controversial, implies that the Animas-La Plata group rapidly achieved political independence from the Chaco polity. The new construction at Wallace and Ida Jean in the early 1100's (Bradley 1988) may indicate the independence of that system as well.

THE CHACO POLITY IN THE 12TH CENTURY

Architectural growth in Chaco Canyon ended by 1130 (fig. 3), the same time that the Aztec sites were largely completed (Ahlstrom 1985). Construction dates, however, are not necessarily the same as abandonment dates (Dean 1978). Further expansion of the Chaco polity in the early 12th century was by then blocked on all sides by its well-organized and aggressive neighbors. Like a pyramid scheme, the Chacoan tribute-driven economy could probably not survive without continued growth, and we might expect either its collapse (Vivian and Matthews 1965) or its reorganization in the middle 1100's (Judge 1989). However, the presence of Mesa Verde Black-on-white on late floors at the top of long sequences of deposition in Pueblo Bonito and other Chaco Canyon sites (Judd 1954, 1959, 1964; Lekson 1984) shows that the decline was less abrupt than is sometimes inferred, and it is likely the Chaco polity endured in some form throughout the 1100's (Toll et al. 1980).

In Great Kiva A in Pueblo Bonito, for example, which was built after A.D. 1085 (Lekson 1984), Judd (1964) reports 17 floors superimposed above a trash layer that contained "McElmo Black-on-white potsherds, proto-Mesa Verde, and Little Colorado Polychrome." This is good evidence for continuity of occupation until at least A.D. 1175-1200 when Mesa Verde Black-on-white began to be made (Morris 1939; Breternitz et al. 1974). Data from Pueblo del Arroyo (Judd 1959) and Chetro Ketl (Lekson 1983) also support this position, and Stein and McKenna (1988) have similarly argued for continuity of occupation at Salmon and Aztec. New tree-ring material from the latter site supports this view (Dean, 1991).

This revision of the Chaco/Aztec chronologies has profound implications. It makes it highly likely that Chaco retained its dominant position in religion and politics of the Eastern Anasazi throughout the 12th century (cf. Judge 1989). The ceremonial equipment, macaw living areas (in Rooms 38 and 249), and other ceremonial remains on the uppermost floors at Pueblo Bonito (Pepper 1920; Judd 1954) and other canyon sites (Pueblo del Arroyo: Judd 1959; Chetro Ketl: Lekson 1983) must then date to the late 1100's or early 1200's, not the early 1100's. But now Chaco was interacting with other, comparably organized multi-settlement polities (peer polities) which were politically independent. In size, however, if we sum the floor area of buildings in the Pueblo Bonito and in the Aztec complexes (Table 1), the former is over twice as large (59,820/26,286); the same conclusion is reached if all of the Chaco Canyon great houses are compared with all of the Animas ones. If these

differences are directly correlated with the threat radius, then the Aztec complex's was probably only half that of Chaco, or two days.

Interestingly, Figure 4 shows that the perimeter two days from Aztec falls short of Chaco, but nearly reaches the Wallace complex. Wallace and Escalante in the later 1100's were displaced by Yellowjacket and other Montezuma Valley sites that are farther away from Aztec's threat threshold. Supposing that the Allentown group had also become a peer polity, the effective threat radius of the Chaco polity in the 1100's was reduced to about three days, and it was effectively in control of only half of that area (fig. 1). The "Chaco polity" is thus indicated by the interlocking set of one-day circles centered on Chaco Canyon in Figure 4.

The 16 great houses within Aztec's 2-day threat radius (at 200 persons/great house community) suggest a population of about 3,200 people, plus (say) 1,500 for the Aztec complex, or about 5,000 for the polity. Similarly, the Chaco polity, with about 46 great houses, may have had a population of about 9,200 plus (say) 2,500 in the Pueblo Bonito complex for a total of about 11,500 people. Alternatively, we could argue that the Chaco polity's population was three times that of the Aztec polity (46/16 great houses).

IDEOLOGICAL EXPRESSIONS

In the middle 1000's, when the economic and political power of the Chaco polity was rapidly increasing, its ideology had a profound effect on its Western Anasazi neighbors, both north and south of Black Mesa. Little "Chacoan" pottery is known in the northern Kayenta heartland (Dean, 1990). Yet in the late 1000's, the Kayenta switched to Sosi and Dogozshi Black-on white designs (Fairley and Geib 1989), thus imitating the contrasts characteristic of Chacoan pottery between solid (Escavada) and hatched (Gallup, Chaco) designs. Similar ceramic trends also happened in Little Colorado White Ware (Holbrook B/Padre) and Virgin Anasazi pottery (Steward 1941; F. Lister 1964; LeBlanc 1989). Mancos Black-on-white, unfortunately, is a taxon that lumps together pottery exhibiting these distinct styles (Breternitz et al. 1974).

Gallup and Chaco Black-on-white have been interpreted as having an "elite" iconographic style that symbolized Chacoan power (Neitzel and Bishop 1991). While agreeing that these designs probably had iconographic meaning, I suggest it is the dualism of the contrast of all-solid versus all-hatched designs that is most significant. Production of analogous ceramic styles by non-Chacoan groups may therefore signal the adoption of a version of the Chacoan ideology by Kayenta and Virgin groups.

Interestingly, a fundamentally different conception is apparent contemporaneously and then later in Reserve and Tularosa, Snowflake (Whipple), some Classic Mimbres and Mesa Verde Black-on-whites, and Soccorro Black-on-white where the opposition of solid and hatched motifs appears on the same vessel (Martin and Willis 1940; Colton 1940; Breternitz et al. 1974; Anyon and LeBlanc 1984). Ideologically, this could signal a different conception about the relationship between the upperworld and underworld, men and women, cultivated or uncultivated, or between the people with sacred knowledge and those without. This Reserve-Tularosa style is centered in the upper Little Colorado-Zuni-Quemado-Tularosa area south of the Chaco polity and it probably indicates competition with Chaco. Indeed, the rise of large settlement clusters during the 1100's in the Kin Cheops area, and others to the south, is also a prelude to the collapse of the Mimbres system, and these events are probably systemically related. By the late 1200's, Zuni (Ramah) had become the center of this political and cultural expression (Kintigh 1985; Fowler et al. 1987).

It would appear that in the 1100's Chaco began producing prestige goods (macaws, feathers, turquoise mosaics) that were given to its peer-polity rivals as political gifts. The remarkable composite frog (toad?) made from layers of haliotis and lavacardium shell with turquoise inlay, and the two superb composite discs of haliotis, turquoise and specular hematite, found with an adult female burial intruded into a room at the Dominguez site (a 12th-century small house associated with Escalante; Reed 1979) are important indications of these relationships. The frog effigy was in a Chacoan style (Pepper 1920) and was worn suspended above the sternum, which suggests that it was worn as an emblem of office (Haury 1976).

The portrayal of macaws in bird cages or associated with carrying baskets on Mimbres Black-on-white or Mimbres Polychrome (Nesbitt 1931; Anyon and LeBlanc 1984; Evans et al. 1985) and macaw skeletons in Mimbres sites (Hargrave 1970) imply that the Chacoans received their birds (and perhaps copper bells and certain shell items) via the Mimbres from farther south, at least until about A.D. 1150 when the Mimbres system is supposed to have collapsed (LeBlanc 1983). In this way, the Chacoans were probably able to maintain their superior religious position, perhaps supplying macaw feathers and bells to elite groups farther north (Sprague and Signori 1963; Hargrave 1979; Nickens 1982; Cole 1990). More significantly, the large number of macaws (42: Fewkes 1900; Hargrave 1970) at Wupatki (eight and a half days west of Chaco), and many other indications there of Chacoan contact or emulation (Stanislawski 1963), point toward the emergence of a Chaco- "southern Kayenta" connection in the 1100's. In the middle 1100's, many Chaco-McElmo pitchers from Chaco Canyon bear Flagstaff Black-on-white designs (Bradley,1991). Flagstaff Black-on-white is also the predominant painted pottery at Wupatki (Stanislawski 1963). Thus it would appear that Wupatki and Chaco Canyon were two ends of a common, shared style zone, which is further evidence of their cultural connectivity.

SOME FURTHER REFLECTIONS

Pursuit of the question of Chaco's decline and abandonment cannot be attempted here. In conclusion, however, several further comments about Chimney Rock Pueblo and its apparent abandonment well before the decline of the Chacoan polity may be in order. If the whole Chimney Rock area was indeed abandoned by about A.D. 1125 (Eddy 1977), then that time is coincident with the rise of Aztec (in the 1120's) as the center of a powerful polity that I infer was at odds with its neighbors. As a Chacoan Outlier, the fortress of Chimney Rock Pueblo lay on the eastern flank of the Aztec polity and thus was a potential threat. It also was a long way from Chaco Canyon and there were no nearby great-house communities to support it (fig. 4). Thus its rapid demise coincident with the rise to power of Aztec is no surprise.

The remnant Chimney Rock (non-Chacoan) populations may have withdrawn to even less accessible mountainous areas in the upper Largo and Gallina drainages to the southeast. Eventually, some of these people coalesced with others to form the Jemez, who continued to maintain their cultural and political independence into the proto-historic period (Ford et al. 1972; Mackay 1977; Lambert 1981). Some kind of macroeconomic connection with early Taos groups may also have existed (Eddy 1975; Cordell 1989) which was broken by proto-Tewa movement into the Chama Valley (Beal 1987).

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Forest, Trees, and Archaeological Vision: A Parable From Chimney Rock

Philip Duke[1]

Abstract — The papers in this volume reflect some of the diverse approaches of modern North American archaeology -- primarily those of the culture-historical and ecological-functional paradigms. Certain themes of the papers are reconsidered from post-processual viewpoints.

THE PARABLE

Several years ago, an archaeologist happened to be at Chimney Rock with some of his students when they ran into a group of tourists being given a tour of the site by a USDA Forest Service guide. As they followed the group for a short while, the archaeologist heard one of them whisper to her companion that this site didn't look quite right. This site, she went on, should be in the desert, not in the pines. Clever person, he thought. She spoiled it all, however, by confidently asserting that the archaeologists probably knew what it was doing there, and the guide would soon make it all clear. When asked, the guide could only give "suggestions," "guesses," and "hypotheses."

Unknown to her, of course, the tourist had hit upon the central conundrum of Chimney Rock; the elemental question underlying all the research projects that have been initiated since Jeancon's first work. What was Chimney Rock doing in the pines? The archaeologists are still unclear. As John R. Roney confesses: what makes Chimney Rock interesting is that "Chimney Rock was established in an area that was not a mainstream participant in the regional system which encompassed the Greater San Juan Basin."

At the same time, our tourist clearly expected archaeology to give her the single and correct version of the past. Our discipline has, with some success, tried to do this since its inception. However, archaeology continually places itself into the conundrum of calling itself a science (we get more research money that way, you see), and then coming up with all sorts of very unscientific answers. No wonder the public is confused by what archaeologists are exactly about and takes refuge in the comforting pages of National Geographic (now there's Truth for you), or the latest Indiana Jones movie.

INTRODUCTION

For years, archaeologists, in attempting to alleviate their ignorance of the past, have sought new methodologies and theories. Today, in certain arenas of the discipline, the search for knowledge is increasingly embedded in a quest to understand precisely the meaning and constitution of that knowledge, and to move us away from an asocial science to one that is rooted in the contemporary fears, needs and aspirations of society; to make archaeology, relevant to more than just its practitioners and a small segment of the public. This movement has been accompanied by a shift away from a strictly positivist view of knowledge, and it is only now beginning to have an impact on North American archaeology; the ultimate intensity of this impact is still unclear.

The papers assembled in this volume are a substantial addition to our understanding of the Chimney Rock site and its place within the Anasazi world. Moreover, they constitute an extraordinarily accurate reflection of North American archaeology and its diversity of interests, approaches and aims. Research at Chimney Rock has been conducted within both the culture-historical and the ecological-functional paradigms, and thus provides a forum in which these paradigms can be critically evaluated. At the same time, new, less positivist approaches to archaeological knowledge can be proposed for our understanding of the site.

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My goals in reviewing these papers are two-fold. First, I will attempt to assess the contribution this volume has made to our empirical and substantive knowledge of Chimney Rock and the prehistoric Southwest. Secondly, I will attempt to develop and evaluate some common themes in these papers from the viewpoint of what has been labeled the postprocessual paradigm. My objective is to augment, rather than to replace, the explanations already offered. I intend no negative criticism of any paper. I have organized my remarks around the following themes: culture-history; ethnicity; explanation and the ecological-functional paradigm; explanation and the "postprocessual" critique.

CULTURE-HISTORY

It is important to stress at the outset that these papers clearly demonstrate it is possible to create an empirically verifiable past. If this statement seems curiously dated, reminiscent of the first antiquarians to whom it was not even clear that the prehistoric past was knowable at all, it seems less so when placed into the context of recent deconstructionist critiques, in which the past is an entirely politically motivated and, thereby, subjective entity (Shanks and Tilley 1987).

We can say with some certainty that Chimney Rock Pueblo was occupied between A.D. 925 and 1150 and that it was abandoned perhaps in favor of the Gallina area. The site has clear cultural connections to the Chacoan cultural system, as evidenced in architecture, pottery traits, and other artifacts. Chimney Rock was a community with a degree of local and regional importance.

Current studies serve to tighten our inferences on the cultural relationships between Chimney Rock and contemporaneous communities, especially of the ceramic studies reported by Mary Sullivan and J. McKim Malville and the tree-sourcing analyses. These detailed and highly specific studies allow us to evaluate competing hypotheses regarding the relationship of Chimney Rock to the wider Chacoan system.

It would be wrong to imply that the culture-historical paradigm is incapable of providing explanations. Several papers in this volume provide such explanations. Frank W. Eddy, for instance, argued that Chimney Rock was founded by a Chacoan priestly colony. Bruce Bradley's model essentially elaborates on this theme, explaining the Wallace Ruin as a religious mission, populated either by indigenes trained in Chaco or actually Chacoan missionaries sent out by Chaco for the express purpose of building such outposts. We can also place within this same paradigm David R. Wilcox's conception of the Chacoan system as a warlike, military state, exacting tribute from its dominion sites. It has also been proposed by Malville, and Sullivan and Malville, amongst others, that Chimney Rock was primarily a ceremonial center, perhaps with only a small resident "caretaker" population, and that the site was used, at least partly, because of the opportunity it provided for observations of the moon.

ETHNICITY

Crucial to describing and analyzing the types of cultural and social relationships, both within the Chimney Rock community and between it and surrounding communities, Anasazi and non-Anasazi, is a better definition of what social groups are represented by the archaeological taxa. It is understandable to conceive of these taxa as some form of ethnographic unit. Gordon C. Tucker talks of the Chacoan "tribe," thereby explicating what others in the symposium perhaps feel implicitly. Jeannette L. Mobley-Tanaka gives the most detailed discussion of the problem of recognizing prehistoric ethnic groups at Chimney Rock. Her arguments would be strengthened if she included dietary variation in her criteria. It is true that there was a pan-Southwest diet, but it is still possible to define variations on this general dietary theme that might have been generated by ethnic differences. After all, numerous anthropologists, most notably Levi-Strauss, have stressed the overwhelming cultural significance attached to dietary habits by most societies.

At the same time, it would be simplistic to assume that variation in the archaeological record is caused only by ethnicity; this was one of the great weaknesses of culture history exposed by the processual critique. It has been pointed out that social variation, as recognized in material culture, can fall out along many different lines (Wobst 1977; Hodder 1978, 1979; Renfrew 1984). We need to give more attention to exploring what social relationships are represented in the archaeological record of Chimney Rock, and to what we mean by such apparently simple terms as "Chacoan" and "Anasazi."

We also need to question whether we can continue to assume that artifact "distance" equates with social "distance" (Hodder 1979), regardless of the social unit represented. This has been done in all the studies presented in this volume. The boundaries between social units need not be clearly demarcated by artifacts, even when these units are independently functioning units; the existence of a recognizable boundary is dependent on other factors (Barth 1969). As an example, Allen E. Kane's hypothesis for the exploitation of the surrounding countryside by the occupants of Chimney Rock is very plausible. However, reasonably extensive surveys of the San Juan Forest north of Chimney Rock have recovered no undeniably Chacoan sherds. This does not mean that we have to reject Kane's hypothesis (which we would have to, were we to assume that artifact distance equals social distance). Rather, Kane's hypothesis must be accepted or rejected on other grounds (for example by tree-sourcing studies), and if we accept it, we must then

investigate why artifactual evidence for this connection is lacking. This pulls us into all sorts of intriguing possibilities about the nature of hunting-and-gathering groups, their relationships to the Anasazi groups to the south, and, most importantly, the roles of artifacts in defining those relationships.

EXPLANATION AND THE ECOLOGICAL-FUNCTIONAL PARADIGM

The culture-historical paradigm was, and still is, considered by many archaeologists to be an insufficiently powerful explanatory paradigm, and certainly by the late 1960's many archaeologists were attempting to replace it. It was argued that such phenomena as diffusion, migration, or invasion are inadequate for the task since they describe, rather than explain, the phenomenon under study. What was needed was an understanding of why these processes occurred in the first place. The paradigm that emerged in North America as a consequence of this dissatisfaction can be termed ecological-functionalism. I prefer this term to processualism because, *sensu stricto*, processualism also encompasses a specific methodology and epistemology of Hempelian/Popperian hypothesis testing. The ecological-functional explanations offered in this volume, for example, do not limit themselves to the methodological strictures associated with the processual school; some are openly inductive (cf. Butzer 1982).

The ecological-functional paradigm assumes social and cultural behavior is functional, both in the Malinowskian sense of contributing to the basic necessities of human survival, and also in Radcliffe-Brown's sense of contributing to a harmonious system of social interaction that is both internally stable and in equilibrium with the external social and natural environments. My use of the term equilibrium is not accidental since Radcliffe-Brown's concept of structural-functionalism is essentially identical in fundamentals to the general systems theory of 30 years later (minus the deplorable English; for this relief much thanks).

Numerous explanations for the creation of the Chimney Rock Pueblo belong to the ecological-functional paradigm. It would be superfluous of me to iterate all of these, but several common themes do seem to appear. One is the existence of the Chacoan system as a means of redistributing resources throughout the northern Southwest. Variations on this theme include debate on whether all of the resources were actually channeled through Chaco, and whether the outliers exchanged directly with themselves. Implicit in this model is that a population-resource imbalance potentially existed. A second theme is that the economic basis to the system was upheld by ideology. Thus, Chimney Rock was captured by the Chacoan ideology. A third theme, typical of the common rejection of culture-historical models, is that the outliers, like Chimney Rock, were indigenous populations that simply "bought into," or adopted, certain elements of the Chacoan culture.

There is still much work to be done on these models, as their authors, I am sure, would be the first to admit. For instance, we need to understand in much more detail the ethnic composition of the communities under study. Also, just as we have sensibly extended our vision from Chaco Canyon to the outliers (contributors to this volume all acknowledge the necessity of this), we also need to cast our gaze even further. None of the papers, for instance, really dealt with the relationship between Chimney Rock Pueblo and hunters-and-gatherers, especially to the north (cf. Duke and Charles 1991). As Upham (1984) has pointed out, students of the Anasazi have erroneously tended to think that power societies (to use Stuart and Gauthier's [1981] term), like the Anasazi, inhabited their territories to the exclusion of other types of society. We need, however, to consider the prevalence of efficiency (hunting-and-gathering) societies in the area, and their relationship to communities like Chimney Rock. Research is vital to a better understanding of strategies such as the exploitation of surrounding resources and timber by the occupants of Chimney Rock.

EXPLANATION AND THE "POSTPROCESSUAL" APPROACH

We can extend our critique of works in the ecological-functional paradigm one step further, along the lines advocated in what has been termed the postprocessual paradigm. I use this term advisedly, since its very nature rejects the sort of programmatic strictures associated with full paradigms.

First, just as proponents of ecological-functionalism asked WHY did such phenomena as invasions take place, and answered with an environmental explanation, it is legitimate to ask WHY one response and not another was chosen? Why did local populations buy into the Chacoan System? Why did local elites signify their importance with Chacoan objects? What already existed in their cultures to encourage them to make the responses that they did make?

Here, environmental change is better seen as a pre-condition to cultural change, rather than as a cause. It is not enough just to create models based on principles of efficiency, such as mini-max and optimal foraging, such that the explanation that attributes the greatest "energy-efficiency" to the group under study is preferred. Indeed, we need to abandon our long-held assumptions that prehistoric societies were congeries of energy-efficient automata. We need to try to place our explanations for their choices into culturally specific and historically charged contexts. This will mean that we may no longer "retrodict" human behavior with any accuracy, but it will allow us, perhaps, to understand the past in a more accommodative and realistic manner.

Secondly, we should recognize that interpretations of Chimney Rock will be conditioned by the debates of contemporary society. These interpretations will change from generation to generation, and this multiplicity of interpretation

will not mean that we have got it all wrong. For example, a case can be made for ecological-functionalism's being a purely politically bred product of its times. Although the current version of this paradigm began in North America with the Willey's settlement studies, it took great hold in the 1960's. It is more than coincidental that its rise occurred at the very time that North American society was acknowledging its abuse of the environment (witness the dates of the original Chaco Project) and, more significantly, its abuse of native Americans. One result was the tacit acceptance that prehistoric Indians had, by in large, exploited the environment correctly (ignoring such apparent anomalies as the abandonments of the American Southwest). Thus, American archaeology unconsciously helped white America's collective guilt trip by demonstrating that prehistoric Indians were environmentally conscious, and that we (i.e. Euro-Americans) were not. I could also add that the stereotype of the prehistoric Indians as pacifist was fostered, no doubt, by such raging controversies as the Vietnam War.

As the environmental movement has matured, we have altered our views on the environment. At the same time, we seem more realistic with regard to the nature of prehistoric Indian cultures. Wilcox, for example, makes a brilliant case for Chaco being an aggressive feudal state, lording it militarily over surrounding regions.

The statement that the past is an accommodative and ever-changing entity is not at odds with my earlier contention that the past is empirical and verifiable. A suitable analogy from history might be that no historian really quibbles over the major events of the Russian Revolution. There are, however, legitimate and logical alternative explanations for why the revolution took place. Thus, I can envisage an archaeology where the events of Chimney Rock are undisputed, but the explanations of those events vary from archaeologist to archaeologist, without any necessary reduction in their legitimacy.

Thirdly, two important constituencies still need to be dealt with not only at Chimney Rock but elsewhere in the continent. Contemporary Pueblo groups have a virtually direct cultural line to the Anasazi. It is necessary to give more prominence to any interpretations of Chimney Rock and other such sites that they may have. We also need to acknowledge perceptions of the site by local tribes, such as the Southern Ute. I know from conversations with Ute elders that their understanding of the site may, in some instances, be radically different from western science's, but such alternative conceptions of the past should be used as springboards for further research, and need not be rejected out-of-hand because of their incompatibility with science. I am not advocating, incidentally, the total relegation of archaeological knowledge; archaeology does have a privileged position for clarifying the past.

Finally, archaeologists need to allow the public to see that different interpretations of the past are not necessarily a sign of ignorance (which we do, so long as we adhere to a positivist commitment to ultimate truths-and then tell the public that we do not know them yet). Rather, we need to engage the public in a dialogue about the past. Let them know that the past is, to some degree, politically determined, and that differing interpretations are precisely what one should expect from a mature, social science. Debate, not certainty, should be the goal of archaeological endeavor, and public sites such as Chimney Rock are ideal vehicles for beginning that debate.

CONCLUSIONS

The discussion has brought us back to the title of the paper. My intention was to indicate the multiple layers of objectives and meanings that can be gained through the study of Chimney Rock. At one level, we can debate the substantive issue of why Chimney Rock was in the trees and not the desert. We can expand our explanation of the tree (Chimney Rock itself) to an explanation of the forest (the Chacoan system). At a deeper level, we can look beyond the obvious (the tree) and see other messages in the archaeological record (other trees in the forest). We can extend our vision and see how archaeological interpretation has shifted with the times, and we can suggest that all of us are in the business of producing political statements, no matter how low-level these might be. Once we accept this element of our discipline, archaeology might finally stop being, to quote a British prehistorian, "just an intellectual game for the meritocracy," and rather provide, amongst other things, a forum for debating not just the past, but also the present.

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The purpose of this symposium was to assist the USDA Forest Service in the future development and protection of the Chimney Rock Archaeological Area. Authors assessed the current state of knowledge about the area and helped develop future research goals. Almost a half-dozen models for the explanation of Chimney Rock and other so-called Chacoan Outliers emerged from the symposium. The meetings became a forum on the nature and role of outliers, their origins, their function, and their relationship to a political, economic, and symbolic center.

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